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Railway & Commercial Gazette

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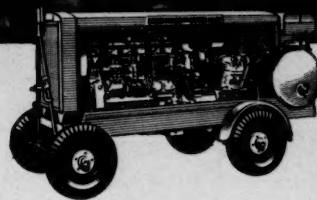
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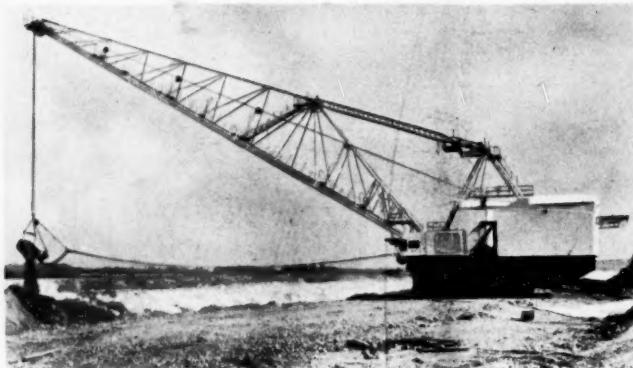
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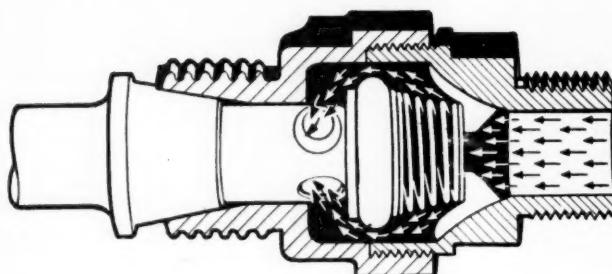
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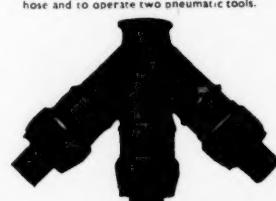
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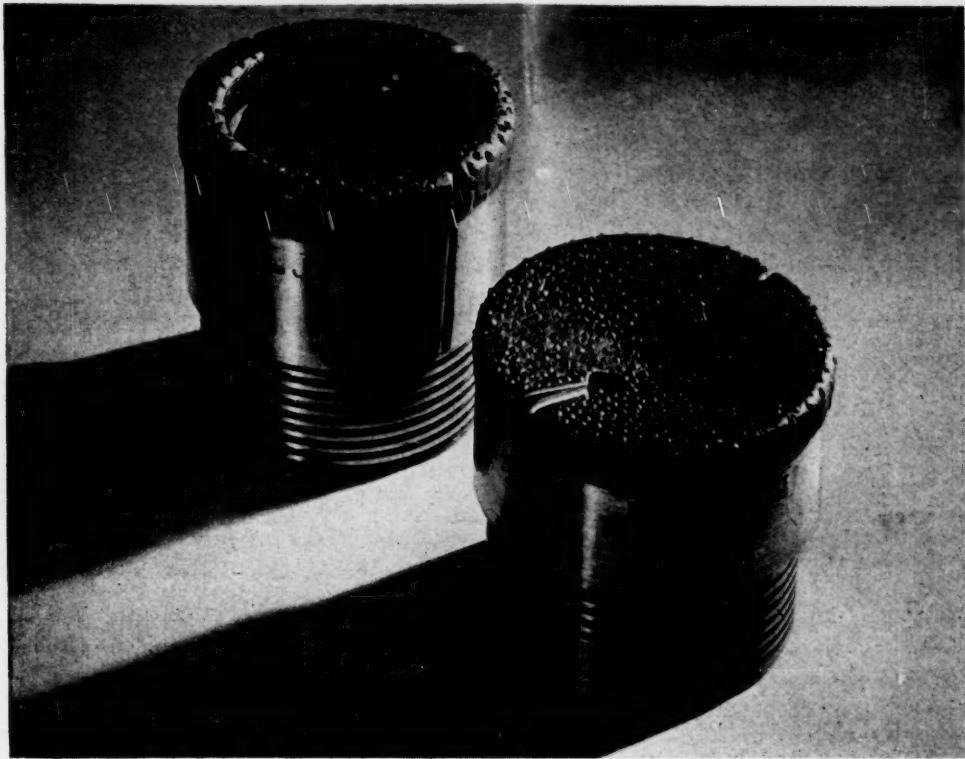
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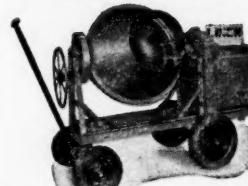
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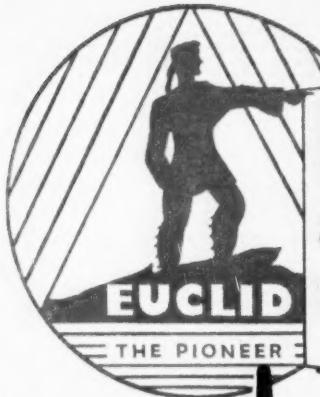
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The Mining Journal

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NOTES AND COMMENTS

African and European Co-operation in the Gold Coast

Evidence that co-operation between African and European in the Gold Coast is becoming a good deal more than a hope and a happy phrase is provided by a statement made at the beginning of this month by Mr. F. J. Erroll, one of the Directors of the Ashanti Goldfield Corporation, who gave his impressions of the situation in the Gold Coast after his recent visit.

As a practical example of co-operation between Europeans and Africans Mr. Erroll instanced the town of Obusasi which, he said, was not merely a mining town where the mine owns all the houses and property, but one which could be considered as a town in its own rights. For here the Ashanti Corporation is co-operating with the local council in building houses and providing public services.

In referring to Trades Union co-operation, Mr. Erroll had the opportunity of being present at one of the meetings between the Gold Coast Chamber of Mines and the African Union of Mineworkers and he found that despite occasional setbacks and mutual misunderstandings much good work was being done. In fact he was sufficiently impressed to declare that in the long run he believed that there would always be full co-operation between the mining industry and the African inhabitants of the Gold Coast. In this view his belief was obviously strengthened by the enthusiasm he found in Accra, amongst a wide range of income groups, for full co-operation between African and European.

If Mr. Erroll's views can be considered as a reflection of the attitude of his colleagues on the Board of the Ashanti Goldfields Corporation group, it is a happy omen for the future of the mining industry in the Gold Coast. The importance of African and European co-operation has never been underestimated by Major Gen. Sir Edward L. Spears, Chairman of the Ashanti Goldfields Corporation, who has on more than one occasion warned that the partnership between African and European was essential for the future of the Colony. On the other hand, the attainment of a high degree of self government in the Gold Coast under the leadership of Mr. Kwame Nkrumah did

give rise to some apprehension and the adoption of a policy by the Corporation best described as "wait and see."

If, therefore, Mr. Erroll does speak for the Ashanti Corporation group it can be viewed as an encouraging shift in emphasis from its former more cautious attitude. More than that, it will greatly help to dispel the fears and anxieties of those investors who for so long have discounted the worth of "West Africans" because of the political uncertainties allegedly dominating the Gold Coast scene.

A Large Copper-Cobalt Project in Uganda

It is anticipated that the Kilembe copper-cobalt mine in Uganda will reach the production stage in 1955, according to a report appearing in *The Northern Miner*, and financial arrangements that will provide all funds necessary until production is reached are said to be nearly completed after many months of negotiation.

The mine is owned by Frobisher Ltd., and while stope development and other preliminary work has been proceeding the New York consultants, Singmaster and Breyer, have worked on designs for the production plant and the company's metallurgical work has been supplemented by investigations of the Battelle Memorial Institute.

Reports state that the Institute has approved a new and unique process developed by metallurgists of Ventures Ltd. It is anticipated that by use of this simple recovery process the cost per lb. of copper will be exceptionally low. This reasonable cost factor will be emphasized when credited with the value of the cobalt output.

The Kilembe seems destined to rank as one of the leading cobalt producers in the world, for operations will commence at an initial ore handling rate of 2,000 tons per day. At this output, annual output of copper will total 25,000,000 lb. and annual output of cobalt 1,500,000 lb.

Officials of the company praise highly the co-operative attitude shown by the Uganda Government, which has proved markedly sympathetic throughout the development stage and which has lent direct assistance by the provision of transportation facilities and hydro power. Given the

estimated initial output, the expected rate of profit promises well for the future and the company should soon pay back the \$16,500,000 that will be needed to reach production. Some \$4,000,000 have already been spent.

Practically no new development has been carried out at Kilembe during the past year, although now some exploratory drilling is taking place. Ore reserves remain at the previous figure of 15,000,000 tons with a cut grade of 2 per cent copper and 0.16 per cent cobalt. Yet the development completed has permitted the transferring of much of the previously "probable and inferred ore" to the proven category. Mining production will be done from surface "glory holes" and underground stopes.

The establishment of transportation facilities from the mine to the outside world is making rapid progress, and the first 50 miles of the 208 mile extension of the East African Railway from Kampala to Kilembe is expected to be completed this month. The railway is financing this project by means of a Government loan, and the Government has in addition let contracts to rebuild entry highways to the mine. An airport has been made at Kilembe.

Arrangements for the supply of hydro power are progressing at similar satisfactory pace. Mr. C. R. Westlake, chairman of the Uganda Electricity Board, has travelled to Canada to complete the arrangements. A 240-mile line is to be constructed from the Board's new power development on the Nile to Kilembe, and next year the first 45,000 kva plant at the development site will go into operation. Power is expected to be cheap and plentiful for future requirements. In the meantime, the company is constructing a small 1,500 kva plant in the vicinity of the mine, intended to serve during the period of construction, and eventually destined to act as a standby unit.

The opening of the Kilembe mine will mean a great deal to Uganda. Hitherto the territory's mineral resources have been described as varied but small. Considerable work has been done on copper deposits which occur on the flanks of the Ruwenzori, which are smaller than the Kilembe deposits.

Other minerals are now being exploited, but broadly speaking, the problems associated with the development of mineral resources in Uganda are largely concerned with products which have not yet been fully exploited. The developments now taking place at Kilembe promote transportation and power schemes, and therefore their benefit to the development of the territory is obvious.

Japanese Delegation Studies Indian Non-Ferrous Metals Market

Writing under date of October 4, our Indian correspondent has reported that Mr. K. Miyata, of the Taihei Mining Co. Ltd. (formerly the Mitsubishi Mining Co.) has stated that Japanese technical experts can considerably aid the development of the Indian mining industry. Mr. Miyata arrived in India last month as the leader of a four-man delegation sent to study the characteristics of India's non-ferrous metal market.

Although no definite plans for Japanese aid to India have yet been completed, Mr. Miyata said the Indian mining industry is eager to co-operate with Japan in a joint venture to develop the potentialities of Indian mining. This interest is particularly directed towards copper output which, with one exception, has not yet even reached the prospecting stage.

Mr. Miyata revealed that since April, the Kamikota Mining Co. has been co-operating with the Metal Corporation of India to develop the Jawar zinc mine at Udaipur in the Rajasthan State. It was hoped a similar arrangement could be made for the mining of Indian copper.

The Dilemma of Coal

(From Our Coal Correspondent)

The present dilemma of coal is that it plays a vital part in the internal economy of an industrial country whilst its cost figures inconspicuously in the national budget as well as in the balance sheets of most industrial and trading concerns. The ratio of the cost of fuel to the national income varies from less than 0.2 per cent in Greece to a maximum of about 7 per cent in Belgium and the incidence of the cost of fuel on the prices of manufactured goods is often insignificant. Although coal is at present used wastefully in colliery boiler plants, the Statistical Statement of the National Coal Board for the second quarter of 1952 shows that boiler coal and the electrical energy consumed at the collieries amounted to no more than 5 per cent of the total cost of production. It is obvious, therefore, that the price of coal would have to be raised very drastically to induce consumers to invest capital on the replacement of inefficient plant.

Some time ago, the Western European Governments used these arguments against the proposal put forward by the secretariat of O.E.E.C. to raise the price of coal in relation to the prices of other commodities as a means of promoting more efficient utilization. The Ridley Committee* were divided on this particular issue, half of them were in favour of imposing an excise duty of £1 a ton on coal, but the other half voted against it.

The Committee gave a good deal of attention to the theory of the relevant cost of coal and other services, and to the intricacies of tariff for electricity but there appears to have been some divergence of views on these basic principles which may account for the fact that the report contains few clear-cut decisions on practical issues and very little evidence of any firm outline of a national policy on which to base legislative action. The report, nevertheless, contains an enormous amount of useful data.

The memorandum submitted by the National Coal Board states that from 1946 to 1951 the average increase in the annual output of coal in this country was 6,000,000 tons, but the rise during the last two years was only of the order of 4,000,000 tons, and more than half of this was due to the working of an extra shift on Saturdays. No further substantial extension of working time can be contemplated for the future. In fact there may be some curtailment of the Saturday shift and an extra week's holiday will almost certainly be granted to the miners before long. It is likely, therefore, that there will be a reduction in the shifts worked even if manpower can be kept at its present level. Looking to the end of the five-year period the Board feel that it would be unwise to base national policy on the expectation that output will rise sufficiently to change the situation.

An advance of industrial productivity at the rate of 4 per cent per annum during the next five years would add £6,000,000,000 to the national income, but, without improvement in the efficiency of coal utilization, this would involve a cumulative increase of 2.25 per cent per annum in the consumption of coal. The Board are perturbed about the disparity between the coal consumption per head of the population in this country and in the other countries of Western Europe. The Board feel that it would be in the national interest to investigate these discrepancies because they appear to be greater than can be accounted for by differences in industrialization and urbanization.

*Report of the Committee on National Policy for the Use of Fuel and Power Resources. London, H.M. Stationery Office. Price: 6s. 6d. net.

Australia

(From Our Own Correspondent)

Melbourne, Oct. 2.

Delays in obtaining materials have been largely responsible for the deferment of the commencement of copper production at Mount Isa, North Queensland. It was hoped that the copper concentrating plant and the copper section of the smelter would be in operation by the middle of this year, but now this new branch of the enterprise will commence work early in the coming year. Mount Isa Mines appear to have a great future, and the view has been expressed by competent observers that the field controlled by the company will before long become one of the greatest in the Commonwealth, and in the production of silver-lead-zinc will ultimately surpass Broken Hill. This view is not based on the existing ore occurrences and mining operations alone, for there are important developmental possibilities in the surrounding country, which are now being prospected by the company. These prospects lie to north and south of the present mine, within a distance of about 30 miles, and there seems good reason to expect a successful outcome from the exploratory work now proceeding. With work on the copper lode established, the copper production of the Commonwealth will be increased by some 18,000 tons of metal per year.

It is expected that production of refined copper in 1952 will be about 18 per cent higher than in 1951. This increase will be, almost entirely, due to greater output from Mount Lyell. The expected production by this company for the year will be 10,000 tons of Australia's anticipated total of 16,000 tons. At the beginning of this year Mount Lyell had 20,400 tons of copper concentrate on hand, which it had been impossible to smelt owing to shortage of coke caused by inadequate shipping services. Coke deliveries have now been improved to 2,000 tons per month, while the average consumption is 1,300 tons per month. The company is now building up a reserve of coke, which will permit increase in the smelting capacity.

Of interest in this regard is the recent increase in the price for copper in Australia by £A.65 per ton, for the Mount Isa Co. stands to gain an extra £A.1,000,000 in revenue on the anticipated output of 18,000 tons of blister copper per annum. There has been an increase in the prices for lead and zinc for local consumption by £A.30 per ton, making the new Australian price £A.95 per ton, which is still well below the London prices. This will mean about £A.3,000,000 a year to those companies that have guaranteed to supply the local market, but Government will collect about one-half this sum in taxes and royalties, while the lead bonus, which affects Mount Isa substantially, will be increased with no corresponding benefit to the company.

MOUNT ISA COPPER SMELTER PARTICULARS

The new copper smelter will treat mill concentrate with an assay value of about 24 per cent copper, the head value of the mill feed being 4 per cent copper. The concentrate storage floor will have a capacity of 5,000 tons of concentrate which, with fluxes, will be fed into bins by a mechanical loader. The roasting section of the plant will consist of two Garfield type roasters, 19½ ft. dia. and 30 ft. high, which will be oil fired. Calcine will be transferred by an electrically operated car to feeders at the reverberatory furnace. This furnace will be 90 ft. long by 17 ft. wide inside the hearth, and will be lined with magnesite brick. Fuel will be pulverized coal, blown in with pre-heated air at the rate of 40 tons per day. Matte will be tapped into 10 ton capacity pots for transfer by a 40 ton capacity over-

head crane to the converters. Slag will be granulated and removed by rail waggons to the mine for use as stope filling. Matte will assay about 38 per cent copper. Converter dimensions are 20 ft. long by 10 ft. dia. and converter slag will be returned through a launder to the reverberatory furnace. The turbo-blower for the converters will be of 930 h.p. Waste heat boilers will utilize heat from the reverberatory furnace to generate steam at 350 lb. per sq. in. pressure and at a superheated temperature of 750° F., which will be piped to the power station for use in the main turbo-generator units.

Gases leaving the waste heat boiler will pass through an air pre-heater which will heat air for use with the pulverized fuel for the smelting furnace. At a later stage it is proposed to refine the blister copper on the mine by fire refining, which does not appear to present difficulties, as the ore is relatively clean. Gases from the roasters, converters and reverberatory furnace will pass through cyclone dust collectors and thence by means of three fans to the stack, 322½ ft. high. The stack is lined with acid proof brick, insulated by 4½ in. of special glass wool so that the cooling of the gases will be insufficient to cause condensation of moisture, resulting in corrosion of the stack.

EXPLORATORY WORK AT KALGOORLIE

There is great interest in the diamond drilling work being carried out by Kalgoorlie Southern Gold Mines N.L. for the location of repetitions of the auriferous beds of the Golden Mile. Encouraging results have been obtained in the northern section of the southern group of leases. There was also expectation that a second layer of quartz dolerite greenstone—younger greenstone—might underlie the calc schist on the eastern part of the field, in the leases of Gold Mines of Kalgoorlie, and if so, it would be at mineable depth. Drilling has now located this second layer of quartz dolerite greenstone, marked by mineralization and strong shearing on the calc schist, in a hole completed at 3,367 ft. These features extend several hundred feet into both calc schist and the second younger greenstone horizon, opening a new era for exploration at Kalgoorlie. It also seems evident that the calc schist carries more ore than was previously expected in its margins adjacent to the upper quartz dolerite horizon. Consequently, views are more optimistic in regard to developing new ore in the upper part of the calc schist.

GREAT WESTERN CONSOLIDATED

Great Western Consolidated N.L., at Bullfinch, Western Australia, is about to become Australia's youngest gold producer when mining and milling are commenced this month. The initial rate of output will be 25,000 tons per month, of which 15,000 tons will come from the open cut. After allowing for the influence on grade of a considerable tonnage of dump ore, a recovered grade of 3.5 dwt. gold per ton is expected, this will rise as the tonnage of underground ore is increased. Cost of mining and treatment is estimated at 34s. per ton of ore, and a profit of 20s. per ton is expected from the initial operations. The general picture is rather better than had been expected at the commencement of mining and treatment, both in regard to throughput and grade of ore. Tonnage and grade of ore in the properties have been soundly established, so that the controlling factor is the movement of costs, which are directly influenced by the rate of wages, and, so far, there has been no move in responsible quarters to curb the regular steep rise, which is becoming a very serious menace to all industry. As an illustration, costs at Gold Mines of Kalgoorlie (Aust.) Ltd., at Kalgoorlie, increased by 18.3 per cent for the year.

Ore Analysis and Treatment

By A. G. THOMSON

The Chemical Research Laboratory of the D.S.I.R. at Teddington has been constructed for radiochemical research and has sponsored, among other developments, new chromatographic techniques as well as possible methods of the extraction and recovery of uranium from minerals and ores. In the following article, the author presents a précis of the work accomplished by various sections of the group, and emphasizes the wide scope of its endeavours.

During open days held from September 23 to 26, visitors to the Chemical Research Laboratory of the D.S.I.R. at Teddington, Middlesex, had an opportunity of inspecting the permanent building which has been constructed for radiochemical research. This development has been necessitated by the expansion of the Radiochemical Group, which has been engaged for some years on a large programme embracing the analysis, extraction and recovery of valuable metals from radioactive minerals and ores. On the analytical side this has involved the development of new methods, such as the new chromatographic techniques described in a *Handbook of Chemical Methods for the Determination of Uranium in Minerals and Ores*, issued by H.M.S.O. in 1950, as well as in a number of publications in scientific journals. Parallel with this work, the Concentration Section of the Group has investigated methods for the extraction and recovery of uranium from minerals and ores, and has carried out basic studies concerning the mechanism of the reactions taking place during these processes.

Another field of investigation is presented by the extraction and recovery of valuable materials from low grade ores. Extraction studies have included basic work on some of the factors which influence solution of certain metals present in low grade ores, and also in ores of a refractory type. Attention has also been devoted to the application of ion exchange resins for enrichment purposes, and this method has shown considerable promise for the recovery of useful metals in solution.

INVESTIGATIONS ON URANIUM

A striking indication of the wide field covered by the Analytical Section in the determination of uranium, thorium and other metals in minerals and ores is afforded by the following brief survey, which is condensed from *Chemistry Research*, 1950. The work includes umpire analysis of uranium in high grade ores and has been extended in some cases by the complete analyses of the constituents of these raw materials. For example, uraniferous iron titanate has been analysed for all major constituents and this involved separation and determination of titanium, iron, rare earths, chromium, vanadium, lead, calcium, silicon, aluminium, thorium and uranium. Other materials have called for analyses for niobium, tantalum in addition to uranium, the common metals, and acid radicles. Another aspect of survey analysis is the analysis of liquid and solid products arising from work within the Group on concentration of uranium in minerals and ores.

A number of improvements have been made in the determination of uranium by procedures using solvent extraction in combination with solid adsorbents. These methods have been the subject of several papers in the scientific Press. A gravimetric method has been investigated for final determination of uranium in solutions purified by extraction methods. It has been found that satisfactory results can be achieved by the addition of cellulose pulp to the concentrated liquid before calcination at 800-900 deg. C.

Analysis of thorium in minerals and ores by methods based on the use of solvent extractions in combination with solid adsorbents is being carried out, the aim being

to provide more rapid methods of analysis and to cover a wide range of thorium concentrations.

STUDIES OF OTHER MINERALS

Research has been carried out on the separation and determination of tantalum and niobium with particular reference to the analysis of minerals and ores containing these metals. Older methods employed separations based on the tannin complexes, but these proved lengthy and difficult to operate in the presence of large quantities of certain other metals such as titanium. Investigations have therefore been made of the use of solvent extraction in combination with a cellulose adsorbent for this work. The use of methyl ethyl ketone containing hydrofluoric acid as solvent, a column of cellulose contained in a polythene tube and samples in the form of fluoride, furnished a useful method of separating tantalum and niobium from a number of associated elements such as titanium, zirconium, iron and tin. By altering the concentration of hydrofluoric acid in methyl ethyl ketone a substantial degree of separation of niobium from tantalum has been obtained. The separation of the earth oxides is now on an analytical basis, and the general method has been used for total tantalum and niobium content in ores.

Attention has been directed to the separation of zirconium and hafnium, using nitrate solutions and extraction with ether containing nitric acid in presence of a cellulose adsorbent. A number of factors which affect the yield and behaviour of zirconium and hafnium nitrates have been examined. The separation of elements other than hafnium from zirconium preparations has been studied. Experiments have been made on the preparation of hafnia free from zirconia using a chromatographic technique.

Members of the Group have been studying separations of platinum metals and gold as chlorides in columns packed with cellulose and with organic solvents containing added acid. A useful solvent for the extraction of gold is ethyl acetate containing 10 per cent nitric acid. Separation from the platinum metals has been quite good, but a trace of platinum passed through the column with the gold. This extraction has been carried out with 0.2 g. gold with only 25 ml. of solvent. Excellent separations of gold on paper strips have been accomplished using the same solvent and detecting the gold by stannous chloride or iodide.

A method has been developed for the separation of phosphoric acid from solutions containing metal salts by treatment with excess sulphuric acid and evaporation until fumes of sulphuric acid are evolved. Treatment with ether then extracted phosphoric acid and excess sulphuric acid, leaving an insoluble residue of metal sulphates. By repeating the sulphuric acid treatment and ether extraction, the phosphate content of a sample is reduced to less than 0.02 per cent of the amount originally present. This quantity was determined by using radioactive phosphorus in the form of phosphoric acid as a tracer. The method has already proved valuable in the determination of thorium in phosphatic minerals and has other applications.

Reference is also made in the report to the development of improved methods of polarographic and fluorimetric analysis and to work on radiometric analysis. Various

elements in the form of radioactive tracers have been used to an increasing extent in analytical research. For example, the use of the tantalum isotope has proved valuable in determinations of tantalum-niobium mixtures. The method consists of irradiating the preparations in the Harwell pile and then measuring the activity after four days, this delay being provided to allow short life isotopes to decay. An estimate of the tantalum content can then be made with an accuracy of ± 2 per cent.

CONCENTRATION

The field covered by the Concentration Section is also very wide. Precipitation experiments with titanite salts in sulphate solution by alkali hydroxide have been carried out and a study has been made of the precipitation of ferric salts on addition of alkali hydroxide to ferric sulphate solutions. Operating with solutions of ceric sulphate, the precipitation of ceric salts by alkali hydroxide has been studied. Methods for the separation and recovery of metal products from solution were the subject of several interesting exhibits.

The equipment used for the treatment of ore includes

a jaw crusher, a disintegrator and two types of ball mills, as well as screening apparatus and a magnetic separator. One ball mill is equipped with large earthenware containers. The crushed ore and earthenware balls are inserted and the containers are clamped into position and rotated for a suitable period. The balls are then picked out and the ore is sieved. A ball mill for smaller samples is also used in the laboratory and is constructed on similar principles.

Among the most interesting exhibits was a Frantz isodynamic separator, which is used for the separation of minerals in accordance with their magnetic susceptibilities. The more magnetic material is drawn towards the strongest part of the field and the remainder passes down under gravity. The two fractions are collected at the base of the chute. By adjusting the current the strongest field can be used for the separation of weakly magnetic materials one from another or from diamagnetic materials. The rate of feed is adjustable, as are also the inclination of the chute and the electromagnet. This separator is being used by the Radiochemical Group for the separation of very weakly or diamagnetic materials; a mixture of riebeckite, monazite and quartz being used for demonstration purposes.

PALEY REPORT—VIII

Magnesium

The Paley Report takes a reassuring tone regarding the future of manganese supplies, saying that as long as present trade relations are not seriously disrupted, it appears that the supply of high grade manganese available to the United States and to the other nations of the Free World over the next 25 years and beyond, will be adequate to meet the growing demand, and at a real price not substantially higher than at present. Reserves are abundant and obstacles to expanding production can be overcome as Free World demand increases. Anxiety, however, remains as to how the U.S. will be able to meet its needs in the event of war.

Apart from stockpiling, utilization of low-grade domestic ores, particularly those in the Chamberlain area of South Dakota, and recovery from waste products, especially basic open-hearth slags, is suggested. Were all the manganese contained in these slags fully recoverable they would yield nearly 75 per cent of the steel making requirements.

U.S. consumption of manganese ore in 1950 was some 1,800,000 s.tons of an average grade of around 46 per cent or 800,000 tons of contained manganese. Some 16 per cent of the manganese content is lost in processing the ore and about 13 lb. of manganese went to the production of one ton of raw steel. A steel output of 150,000,000 s.tons—the projected level for 1975—would call for about 2,500,000 tons of 46 per cent ore and with an allowance of some 200,000 s.tons for other uses gives a projected consumption of 46 per cent ore of around 2,700,000 tons.

Other Free World producers with a steel output of 70,000,000 tons of ingots in 1950 consumed about 1,300,000 tons of ore, this consumption is projected to reach around 2,300,000 tons by 1975, thus raising the total requirement from 3,100,000 tons in 1950 to 5,000,000 tons in 1975.

As regards reserves of manganese ore Russia is credited with half the known supply and twice the production of any other country but no particulars are furnished as to how the estimate is arrived at. The apparent consumption of the Soviet countries is put at 1,650,000 tons while the actual consumption of the U.S.S.R. is taken to be about

1,000,000 tons. Soviet manganese exports to the U.S.A. had practically ceased by 1950 but the possibility of their resumption at competitive prices has had a deterrent effect on new projects elsewhere.

Total world reserves of an average grade of 45 per cent manganese are given as 482,600,000 tons and of low grade (averaging 25 per cent) 814,600,000 tons. The following tables show the Report's estimates, admittedly not in all cases fully authenticated, of the reserves of good grade and lower grade ore and an estimate of the production in 1950 for all grades by principal producing countries excluding U.S.S.R. and satellites.

World Manganese Ore Reserves

| Country | 45% average grade | 25% average grade | 45% average grade | 25% average grade |
|------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | (million t.tons) | (million t.tons) | | |
| Russia | 200 | 500 | Mexico | 0.7 |
| India | 100 | 200 | Sweden | 0.5 |
| South Africa | 50 | — | Cuba | 0.4 |
| Brazil | 45 | — | Egypt | — |
| Morocco ... | 30 | 20 | Portugal | 12 |
| China | 20 | 10 | Rumania | 10 |
| Gold Coast | 10 | 20 | Hungary | 4 |
| Congo | 10 | 20 | Manchuria | 3 |
| Indonesia ... | 10 | — | U.S.A. | 0.7 |
| Philippines... . | 3 | 3 | Italy | 0.5 |
| Angola | 1 | — | Palestine | 0.5 |
| Turkey | 1 | — | Total... . | 482.6 |
| Sicily | 1 | — | | 815.3 |

Principal Manganese Ore Producing Countries—1950

| (In tonnes of minimum 30 per cent Mn content) | |
|---|---------|
| India | 936,224 |
| South Africa | 790,937 |
| Gold Coast | 722,783 |
| Morocco | 287,266 |
| Egypt | 152,169 |
| Brazil | 148,339 |
| Japan | 134,066 |
| U.S.A. | 121,971 |
| Cuba | 79,209 |
| Mexico | 32,400 |
| Turkey | 30,978 |
| Philippines .. | 29,867 |
| Chile | 27,000 |
| Spain | 17,329 |
| Congo | 16,990 |
| Italy | 16,208 |
| Australia | 15,108 |
| Yugoslavia .. | 14,000 |
| Sweden | 11,847 |
| Angola | 9,308 |

Alcan Meets the Challenge of the Aluminium Shortage

Aluminium is relatively speaking a newcomer to the ranks of the industrial metals, yet even so it has already established itself as a major segment of the mining industry and the time may not be far distant when its production, quantitatively speaking, will be second only in magnitude to steel. Some indication of the rate of expansion in the use of aluminium can be gauged from the fact that consumption *per capita* in the United States for the twenty-year period from 1930-1950 rose from 1.8 lb. to approximately 16 lb.

World consumption of primary aluminium in 1950, excluding U.S.S.R. and satellite countries, was in the neighbourhood of 1,500,000 s.tons of which 900,000 was accounted for by the U.S. The conclusions of the Paley Report on aluminium (summarized in *The Mining Journal* of September 19) gave a forecast of Free World consumption by 1975 of 6,000,000 s.tons—four times the 1950 consumption. Of this amount, it is suggested that the United States may absorb 3,600,000 s.tons. These estimates are necessarily extremely tentative and depend to a considerable extent on the development of potential uses for aluminium which at present can only dimly be foreseen and now constitute an insignificant proportion of consumption.

THE ECONOMICS OF INCREASING U.S. PRODUCTION

At the same time there is no reason to regard these figures as unduly extravagant and the numerous development plans for aluminium which are now on hand throughout the world lend support to them. As reported from Washington in *The Mining Journal* last week (p. 408), the Defence Production Administration has now raised the immediate production capacity target for U.S. producers by 200,000 tons, bringing it up to around 1,700,000 tons per annum or approximately double U.S. production in 1951. The United States hydro-electric resources are, however, already being very fully utilized and the achievement of this tremendous increase in smelting capacity is only going to be achieved by using other and more costly means of generating electric power. Leaving aside the arguments of the various Washington lobbies (which will, of course, in fact have an important

influence on the march of events), developments of this magnitude would only appear to be justified on broad economic grounds if either

- (a) imports from other natural producing areas appear likely to be insufficient, or
- (b) these sources appear likely to be cut off in case of war.

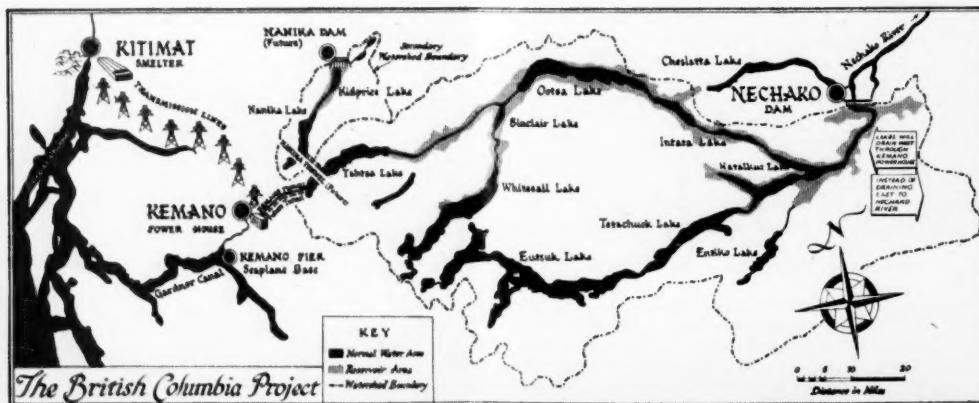
As it happens one of the countries of the world most favourably endowed with hydro-electric resources is Canada with an estimated potential of 55,000,000 h.p., only a quarter of which is at present developed. Inevitably Canada is one of the world's principal aluminium producers and her nearness to the United States' industrial centres inevitably necessitates the viewing of plans for the expansion of U.S. production against the background of Canadian potentialities. Indeed, as readers of *The Mining Journal* will be aware, the great aluminium debate which has been raging in Washington this year centres very largely on the extent to which the U.S. should rely on meeting future increases in her requirements of ingot metal from Canadian sources.

CANADA'S VAST EXPANSION

To speak of Canadian aluminium production, which totalled about 450,000 s.tons of primary metal last year, means virtually to speak of the activities of Aluminium Ltd. and its huge international network of operating and distributing companies. Chief of these is the Aluminium Co. of Canada (Alcan) which produces primary metal for the group.

The huge scope of Alcan's mining, ore treatment and smelting activities is brought clearly into focus in an admirable little film entitled "Packaged Power" which is shortly to be released to general audiences. The film, which won the award for the best industrially-sponsored film made in Canada last year, is a "must" for anyone trying to visualize, in concrete terms, the kind of things which are taking place in the present Canadian boom.

The first part of the film is devoted to Alcan's existing chain of enterprises from the working of bauxite deposits in British Guiana via the ore treatment plant at



Mackenzie on the Demerara River, to the reduction works at Arvida in Northern Quebec, which derives its hydro-electric power from the waters of the Saguenay River whose hydro-electric stations together generate 2,000,000 h.p. for what is at present the largest aluminium smelter in the world. Arvida's output goes mainly to the U.K. and the U.S. In the U.K., Aluminium Ltd.'s subsidiary—the Northern Aluminium Co.—has rolling mills at Rogerstone in South Wales, which together with the company's mills at Banbury, supply the British market, which is still Canada's largest customer, with the group's fabricated products. This part of the film is, however, largely a matter of history, although the newest link in the chain—the Rogerstone mills—was fairly recently described at length in our issue of November 17, 1950.

Of considerably greater interest is the last portion of the film dealing with Alcan's vast project for establishing a new smelter at Kitimat in British Columbia supplied by bauxite from Jamaica.

Already at Mandeville, in Jamaica, the first great alumina plant to be erected in the Caribbean area is under construction and by late 1953 is expected to be yielding at least 450 tonnes of alumina daily from the island's bauxite deposits.

This alumina will be shipped by sea to the Kitimat smelter at the head of the Douglas channel on the Pacific coast some 400 miles north of Vancouver. In its initial stage, the smelter will have a capacity of 91,500 s.tons which is scheduled for the early part of 1954, although its ultimate capacity will be over 500,000 s.tons, this by itself about doubling Canada's present output.

To provide the huge amount of hydro-electric power required for the Kitimat smelter, this British Columbian project has been planned on truly Homeric lines, the salients of which are illustrated in the plan on the first page of this article. By building a dam at Nechozo nearly

to 2,800 ft. above sea level. From this height their waters will be hurled down to the sea level at Kemanzo through a ten-mile tunnel bored through the solid rock from the eastern end of the Nechozo lake system to the Pacific Ocean side of the mountain range, which at the same time will itself be providing the watershed supplying the lakes.

This tunnel alone is a major feat of mining engineering, some indication of the magnitude of which is given in one of the photographs on this page. Eventually there will be two parallel, 25 ft. diameter, concrete-lined tunnels running 300 ft. apart. Several raises from these tunnels will also be required for the operation of sluice gates. The No. 1 tunnel which is now in process of being drilled, is by itself involving the removal

of over 5,000 tons of rock a day, a rate which will be kept up seven days a week for another year. It is being advanced from four separate headings, each being advanced 27 ft. per day. To obtain access to two of these headings which are being advanced from the centre outwards, it was necessary to sink an access tunnel vertically to a depth of 1,800 ft. from the mountainside.

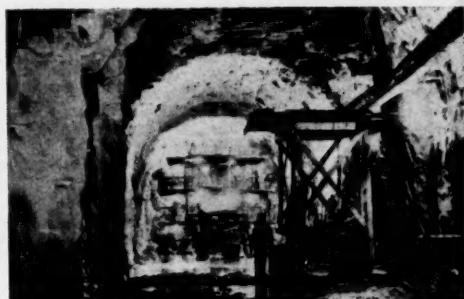
The power house chamber will be built inside the mountain itself and will be excavated at the foot of the tunnel from solid rock to the dimensions of 100 ft. high by 80 ft. wide by 700 ft. long. Eventually the length of the chamber may be extended to 1,100 ft. to house 16 vertical impulse-type turbines, each with a capacity of 150,000 h.p. and 16 generators each with a minimum capacity of 122,000 kVA. When the drilling of the second tunnel has been completed a power output of 1,650,000 h.p. will be obtained, thus almost duplicating the horse-power generated on the Saguenay River in Quebec. This power will be carried by power line 50 miles north-west over the mountains to the Kitimat smelter. On the way the transmission lines will rise to a height of 5,300 ft., where, to withstand the icing loads at this considerable height, a



The view north-west along the Kemanzo Valley transmission line location. It is here at Kemanzo Camp that the ten mile water tunnel will end



The site of the Kenney dam on the Nechozo River. The former river bed has been bypassed by a tunnel to left of the picture



Work in the tunnel, showing simultaneous drilling at different levels by use of mobile platforms

150 miles to the east of Kitimat a chain of small lakes and rivers will be linked together and their flow reversed westwards. The Nechozo dam will raise the level of these lakes

steel reinforced aluminium cable of 2.26 in. diameter will be used, the largest of its kind ever planned for the purpose.

Correspondence

SIERRA LEONE MINERAL DEPOSITS

To the Editor, *The Mining Journal*.

Sir.—In his article on Sierra Leone (*The Mining Journal*, August 22, 1952, p. 197) Mr. A. G. Thomson refers to the early history of geological survey and mineral discovery in the Colony. It seems to me that his brief remarks on this subject may convey the false impression that it was the geological mapping carried out in 1918-21 that pointed the way to the discoveries of the deposits of diamond, gold, platinum, iron ore and chromite made by me in 1926-28 and by my colleague, Mr. J. D. Pollett, and myself in 1929-30.

Prior to 1926 no minerals had been exported from Sierra Leone and no deposits of commercial importance had been found, and it was generally believed that the mineral resources of the Colony were negligible. The object of my mission in 1926 was specifically to make a rapid survey of three areas, one a large area underlain by the Rokell River series of rocks and the others, small areas near Kenema and Pendembu respectively, which from previous work were considered to be worthy of investigation. The Rokell River series, wrongly as it turned out, had been compared with the mineralized Birrimian series of the Gold Coast. No mineral deposits of commercial importance were found by me in any of these areas and none has since been found in them.

My discoveries of the Marampa iron ores, the rich alluvial gold deposits in the Makawke and Pampana Rivers, and of platinum near Freetown, were all in areas not included in my itinerary which had to be modified because of a local railway strike and a hold up in sea passages resulting from the transport strike in the United Kingdom.

On my return to Sierra Leone in 1927 it soon became apparent that the principal mineral deposits, other than platinum and ilmenite, were closely associated with narrow belts of schists occurring as roof pendants in granite and gneiss which appeared to be devoid of important mineral deposits except near the schist contacts. It was the recognition of this fact, combined with intensive field work in these schist belts, that led to our discoveries of the gold, diamond, chromite and iron ore deposits, as well as other economic minerals, during the period 1927-30. The schist belts referred to were not mapped by Dr. Dixey and only two small areas of the schists are shown on his geological sketch map of Sierra Leone.

Our discovery of diamonds in what is now known as the Yengema diamondfield was made during my last reconnaissance in Sierra Leone prior to my transfer to the Gold Coast in 1930 as Director of the Geological Survey. The gravel tested averaged $1\frac{1}{2}$ ct. per cu. yd., but little interest was taken in the discovery until Consolidated African Selection Trust commenced to investigate the area on my advice, early in 1931.

The total cost of the Geological Survey from 1926 to 1930 was less than £12,000. This figure is well under 1 per cent of the direct revenue since received by the Government from diamond, gold, platinum, iron ore and chromite mining operations.

The fact that no discoveries of major importance have been made in Sierra Leone during the past 15-20 years is not significant as relatively little geological and prospecting work was carried out during that period until very recently. There is still considerable scope for the discovery of important mineral deposits, including gold, diamond, bauxite and chromite, in and adjacent to the schist belts, and there are possibilities of concentrations of copper, nickel and platinum ores in the basal part of the norite mass near Freetown, which need investigation.

Of the known undeveloped deposits, the Tonkolili iron ores, which constitute one of the largest reserves of favourably situated high-grade iron ore in the world, are of outstanding importance. Their magnitude and richness was recognized in 1930 when I traced them continuously for more than five miles over great widths. One hill alone contains more than 70,000,000 tons of easily won good-grade ore (*Ann. Rept. Geol. Surv. and Mines Dept.*, Sierra Leone, 1930-31, pp. 3-4, 12-13 and 17).

The ilmenite and titaniferous magnetite lodes, extending from Freetown to beyond Hastings, are of importance as a potential source of titanium, iron and vanadium. They are very favourably situated and contain from 10 to 48 per cent TiO₂ and 35 to 53 per cent iron.

Heavy concentrations of alluvial rutile, ilmenite, ilmenorutile, zircon, monazite, corundum and garnet are known in various parts of Sierra Leone, especially near the coast. They

have commercial possibilities, which have not yet been explored to any extent.

89, Kingston Hill,
Kingston-on-Thames,
Surrey.

N. R. JUNNER.
October 13, 1952.

(*The writer explains that absence abroad was responsible for his not seeing Mr. Thomson's original article at the time it was published. The details he gives have not been published previously.—Ed., M.J.*)

Plans for the Fifth Empire Mining and Metallurgical Congress

Every major mining field and metallurgical plant throughout Australia is included in one or other of the tours being organized for the Fifth Empire Mining and Metallurgical Congress, to be held in Australia and New Zealand during April and May, 1953.

Prior to the opening there have been arranged alternative tours of Tasmania, each of which will occupy a week.

The Congress, which opens in Melbourne on April 20, will be devoted to two days discussion of official Congress publications on aspects of the Australasian mining and contemporary scene.

The Congress volumes to be considered at the forthcoming Congress are the following:

Volume I—*Geology of Australian ore deposits* (1,100 pages).

Volume II—*Mining methods in Australia and adjacent territories* (350 pages).

Volume III—*Ore dressing methods in Australia and adjacent territories* (350 pages).

Volume IV—*Extractive Metallurgy in Australia* (400 pages).

Volume V—*Australian Mining and Metallurgy* (300 pages). Covers ventilation, safety, hygiene, mining regulations, industrial regulations, education, training and research.

Volume VI—*Coal in Australia* (750 pages).

Volume VII—*Handbook—Australia and New Zealand* (250 pages).

Volume VIII—*Congress Proceedings and New Zealand Papers*.

Volume I will be available to registered members of the Congress next December at £A.2 10s. plus postage. Volumes II to VI inclusive will be similarly available in January in pre-print form at £5. (Aust.) plus postage and will subsequently be published in bound form with a report of discussions at the Congress. Volume VII which aims to supply members with general background information of social and economic affairs will be issued free. Volume VIII will be available towards the end of 1953 although the New Zealand papers will be available separately in pre-print form prior to the Congress.

On April 26 the Congress will travel to Canberra, and members will be the guests of the Commonwealth Government. From Canberra members will proceed to Sydney, from which centre three alternative tours have been arranged.

Tour No. 1—From Sydney on April 28 until May 21. Highights of this tour will be: (1) Mechanized coal mines, steelworks, copper smelting, metal rolling, and fertilizer manufacture in Port Kembla district. (2) Lead-zinc-silver mining and milling at Broken Hill, New South Wales. (3) Lead smelters at Port Pirie, South Australia. (4) Iron ore mining at Iron Knob in South Australia. (5) Opencut mining of coal at Leigh Creek. (6) To Tennant Creek, Gold mines. (7) Mount Isa lead-zinc-copper-silver field. (8) Mount Morgan gold-copper mine, Queensland. (9) Recovery of zircon and rutile from beach sands near Brisbane. Fare £100.

Tour No. 2—From Sydney on April 28, this tour includes Newcastle—the steel centre of the Commonwealth. Port Kembla, Australia's No. 2 steel centre Broken Hill, Port Pirie, Whyalla are included (as in Tour No. 1) and from Adelaide to Kalgoorlie.

From Perth to Sydney, arriving on May 22. The fare is £110.

Tour No. 3—At half the costs of Tours 1 and 2, the third tour will cover Sydney, Broken Hill, Adelaide, Whyalla, Port Pirie, Adelaide, Sydney, Newcastle, Sydney, Wollongong, Sydney, Lithgow, and Sydney. From April 28 to May 16. Fare cost is £45.

After the conclusion of the Australian section of the Congress on May 22, delegates may visit New Zealand, where a tour of 16 days, covers gold dredging, coal mining, hydro-electric power plants, and geothermal steam experiments.

With the co-operation of the gold mining companies in Fiji, it has been arranged that a number of delegates may visit the Colony.

Readers who desire to have more detailed information on the tours, and on other phases of the Congress, are invited to write by air mail to the Secretary, Fifth Empire Mining and Metallurgical Congress, 399 Little Collins Street, Melbourne.

REVIEWS

Yearbook of International Trade Statistics, 1951.—A United Nations Publication. Available from H.M. Stationery Office. Pp. 272. Price 17s. 6d.

This second issue of the United Nations *Yearbook of International Trade Statistics* shows tables for 52 countries as against 42 in the previous publication, and in addition contains for the first time tables for the trade by commodities of 20 countries, according to the Standard International Trade Classification. These tables account for approximately 60 per cent of world imports and about the same proportion of exports.

Details of the trade of each country appear in historical tables, lists of the quantity and value in national currency of imports and exports in recent years analysed by commodities, and in tables showing for recent years the value in national currency of import and export trade analysed by principal countries of origin and destination. The figures contained in the tables are obtained from official sources published by the governments of the countries concerned, and in all the yearbook under review is a valuable publication.

Metal Industry Handbook and Directory, 1952.—Published by the Louis Cassier Co. Ltd. Pp. 448 with index.

In this 41st edition of the *Metal Industry Handbook and Directory*, information has been brought up-to-date on the properties of the metals, and the section on metals statistics has been rewritten to clarify the present and future position as to supplies and prices. For the remainder, the book contains detailed information on metals and their alloys, as well as on standards specifications. The directory for buyers has been considerably enlarged in this edition, to facilitate the task of finding suppliers of plant for, and the product of, the non-ferrous metals industry.

Metal Statistics, 1952.—Published by American Metal Market at \$2.50. Forty-fifth annual edition, pp. 864 with directory and index.

A valuable and compact directory of statistical information on ferrous and non-ferrous metals and miscellaneous economic subjects. In a foreword the editors regret that lack of reliable information from the Soviet Union has prevented the accurate presentation of world totals, but additional information is given on tin prices, and American utilization of lead is presented in greater detail than heretofore.

Lead in Modern Industry.—Published by Lead Industries Association and obtainable from the Association at 420, Lexington Avenue, New York 17, U.S.A. Pp. 230 with photographs and tabulations. Price \$1.50.

The beautifully produced and well illustrated work under notice is presented as the only book currently available of which the subject matter is devoted exclusively to the manufacture, applications and properties of lead, its alloys and compounds. The book was written with the purpose of providing the public with a broad picture of the lead industry, and simultaneously to serve as a convenient source of reference for those already using lead and its products.

In its entirety, the book is of interest to layman and specialist alike, for not only is it sufficiently technical to be of practical value to the engineer, but its general appeal is yet broad enough for those readers possessed only of a more casual interest. The story of lead begins in far off times, as the earliest known specimen of the metal is a figure dating to 3000 B.C., and continues as a feature of much of mankind's building operations throughout recorded history. The end of the story is reached by a study of the modern and more scientific applications of lead, its alloys and compounds, in twentieth century industry.

The twenty-eight chapters which complete the work continue to give details of its production from a mineral ore to a refined metal. They present in addition a description of the various techniques for the fabrication of the metal into useful form. Ore concentration and the smelting of concentrates receive mention in these early chapters, as do refining processes such as the Betts, Parkes, Harris and Pattinson methods. In general, the tone of the work is more specifically concerned with the treatment of lead as it concerns the United States.

Separate chapters are devoted to the more important modern uses of lead, which include the manufacture of storage batteries,

cable sheathing, chemical construction of different types, radiation protection and numerous other applications. The corrosion resistance of lead and its alloys and methods of their utilization for chemical construction are mentioned in full detail, together with the techniques practised in the joining of lead.

The remainder of the book is devoted to the manufacture, applications and properties of industrial lead compounds including white lead, litharge, red lead, tetrathyl lead and other forms. White lead paints and metal protective paints are presented in some detail, and formulations are given for a variety of specific applications. The latest specifications for lead, its alloys and products, as well as the properties of lead and alloys and the physical constants of organic and inorganic lead compounds, complete an educational and useful work.

The Stock Exchange Official Year Book, 1952.—Vol. 2. Published by Thomas Skinner & Co. (Publishers) Ltd. Price for the two annual volumes £7 net, by post (inland) £7 2s. 9d., and **Register of Defunct and Other Companies, 1952.**—Thomas Skinner & Co. (Publishers) Ltd. Price £1 net.

Volume 2 of *The Stock Exchange Official Year Book*, just published, is the second half of the 1952 issue of this standard work of reference. Volume 2 now comprises the important sections: Commercial, Industrial and the like, and Mines. A few copies of Volume 1 are still available, and this work contains all Government Securities, Railways, Banks, Breweries, Insurance, Iron & Steel, Oil, Rubber, Shipping, Tea, Telegraph, Telephone, Tramway and other sections, and has taken over from Volume 11 the Financial Trusts, Land and Property and Investment Trusts.

The entire work was split into two volumes at the beginning of 1949 for general convenience, and the two volumes now total some 3,700 editorial pages and are approximately equally divided in size. The work of bringing Volume 2 up-to-date has been heavier than usual owing to the revision of the details of the rights of preference shares, but this work has now been completed, and has involved the examination of many hundreds of Articles of Association. At the same time, the number of new companies introduced into the two volumes is this year about 136, following a similar number in 1951.

The two volumes are sold at the all-in price of £7 net, and are an indispensable guide to Government and joint stock finance. They are under constant revision, improvements and extensions are made year by year, and there exists no other reference work of similar authority. Volume 2 contains a combined index of both volumes, the folios of each volume being distinguished by heavy and light type.

The Register of Defunct and Other Companies, 1952, which each year makes its appearance with Volume 2 of *The Stock Exchange Official Year Book*, is steadily increasing in size, and contains the accumulating information as to the demise or reconstruction of securities and companies which have passed out of the previous editions of *The Stock Exchange Official Year Book*. It is presented as the only publication which records the effects of the nationalization schemes on the securities taken over. This record of "defunct" securities provides a most valuable saving in time for all who are engaged in dealing with deceased estates, especially solicitors and executors, and becomes increasingly indispensable each year.

The South African Financial Year Book, 1952.—Published by R. Beerman, Publishers (Pty) Ltd., Capetown, and edited by E. Landsberg, D.Econ. Representatives Thomas Skinner & Co. (Publishers) Ltd. of London. Pp. 1,353 with index. Price 75s. (7s. 6d., carriage paid).

The valuable volume under review contains detailed information of over 1,000 companies which operate in Southern Africa, the Rhodesias and adjoining territories. An alphabetical index of Southern African company directors with their designations is included, and other details contained within the volume are the names of secretaries, auditors and bankers, as well as all financial matters from tabulated balance sheets to dividends and aspects of taxation. A classified list of trades presents companies under the various classes of business with which they are connected.

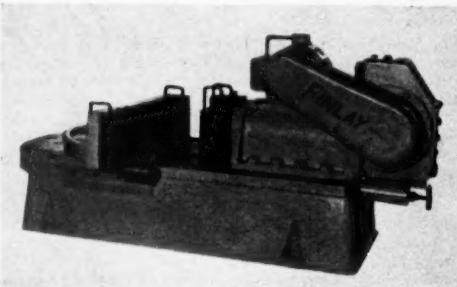
Additional value is given by articles on taxation, brokerage rates, stamp, estate and succession duties, stock exchange practice, and South Africa's currency position. A list of technical and mining terms, a list of stock exchange terms in common use together with an alphabetical list of stockbrokers complete a useful book of reference.

MACHINERY AND EQUIPMENT

Reconditioning Metal Roof Supports

The current trend in underground workings to utilize metal for roof support in place of the more traditional wood, is finding increasing favour in mining fields all over the world. From this trend has sprung the need for some small and convenient yet powerful and easily operated machine which would cold-bend the various types of underground metal support to the required shape.

Specifically to meet this demand, a hydraulic press has been developed by The Finlay Conveyor Co. Ltd., which seems destined to prove useful in shaping and reconditioning all types of roof supports, which include arch rings, props, roofing bars and cambered girders. It is equally suitable for the cold bending of railway track sections, and since it is operated by compressed air, the unit may be permanently housed underground at any convenient point.



The Finlay Patent hydraulic press, model R 100 E.B., with standard pressure head

In its basic construction, the machine consists of a press unit comprising a horizontal ram and cylinder, pump assembly and power drive, and a bedplate or other mounting. The ram cylinder is cast in high tensile, close grained iron, and is machined to take the ram, control valve, safety valve and pump assembly. A cast steel ram head is fitted to the polished steel ram on standard models, although for particular work crossheads or other varieties may be fitted.

The ram movement is controlled by a hand operated lever, and operates the pressure control valve by rotating a cam. The safety valve uses a light oil as a pressure medium, and may be adjusted to operate at any pressure up to the limit of the press capacity, which ranges from 40 tons to 100 tons, although this valve normally is set for maximum pressure. Two plunger pump units are operated by a two-throw cam shaft through tappet levers, while ball or roller bearings carry the cam shaft, and all wearing surfaces of the equipment are of hardened steel.

The whole equipment may be mounted on rail wheels for quick transportation, and the unit may be used underground at any point where a supply of compressed air is available. While compressed air is widely used in the underground operation of the machine, through the medium of a rotomotor, alternative power units include electric or petrol motor, or Diesel engine. The power required to motivate the unit is 3 h.p. for 40 to 70 ton models, and 5 h.p. for the 100 ton model.

Copper Tape Electric Vulcanizer

To provide a precise and easily operated means of vulcanizing sheath and core repairs in the manufacture and maintenance of trailing cables, British Insulated Callender's Cables Ltd. have introduced a copper tape electric vulcanizer. The unit requires no liners, chamber or bath, so that length and diameter of repair is not limited. The vulcanizer is suitable for use on A.C. single phase circuits, the electrical loading being less than 1.5 kW.

The necessary heat and pressure are provided by a copper tape wrapped tightly around the repaired section and connected with suitable safety appliances to the low voltage, high current winding of a transformer. The primary winding can be arranged for any specified single phase supply between 110 v. and 600 v. A thermocouple operated millivoltmeter is included for temperature indication.

A New Type of Floating Steam Hammer

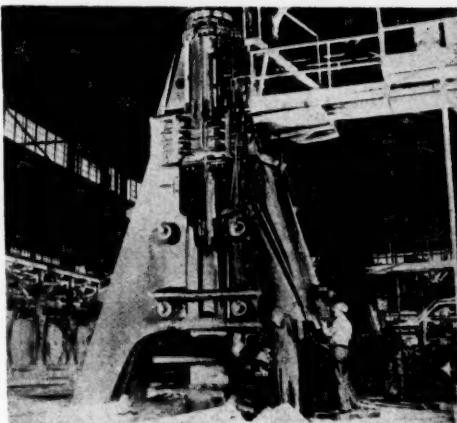
A steam operated hammer that floats on a concrete raft set in a concrete basin has recently forged its 15,000th ingot at the Huntington, America, works of the International Nickel Co. This production figure brings the total output of the hammer to 75,000,000 lb., and it is stated that the mounting of the machine on the spring supported concrete raft in a concrete pit eliminates ground vibration and reduces maintenance costs.

The installation at Huntington is the first occasion on which this type of foundation has been used for a steam forging hammer, and it represents a joint development by vibration experts and other engineers. The main part of the hammer's production to date has comprised forgings of the high nickel alloys used for jet engine parts and other heat resistant applications. The strength of these materials is such that they give rise to forging problems not common in the production of the more widely used industrial metals such as steel, or the softer materials such as most of the copper base alloys.

The hammer has an overall weight of 521 tons and stands approximately 40 ft. in height from the bottom of the foundation to the anvil. It converts large nickel alloy ingots from the melt shop of the company into workable forms for further processing as sheet, rod, wire or tubing and other commercial forms, and an elaborate arrangement of springs eliminates ground vibration.

The legs and anvil of the hammer are bolted to a concrete base 21 ft. in length, 18 ft. wide and 10 ft. thick, which rides on a type of rubber spring or cushion, described as a slab of special type rubber bonded on each side to a steel plate. This rubber spring is supported by a second block of concrete of similar size to that described, and together these two concrete blocks form the raft, with the bottom of the lower block riding on 432 steel coil springs which resemble those used on railway coaches.

These steel springs are mounted on a concrete floor supported by cement pillars, and in its entirety the foundation from the uppermost concrete block to the bottom of the pillars reaches 40 ft. below the floor of the forge shop. This construction differs radically from the conventional steam hammer foundation, which hitherto has consisted of concrete pad and several tiers of timber 12 in.



The International Nickel Co. Floating steam hammer

square. Vibration from the old style of installation is reported to have been felt throughout the Huntington plant, which comprises some 90 acres. Its effect was marked on other equipment in the hammer shop as well as in all other adjacent buildings, including the machine shop and extrusion building, and is said to have added considerably to maintenance problems.

The new foundation represents a joint development by the designer, J. H. A. Crockett, of London, the technical supervisors of the construction, Robert W. Hunt Co. of New York, the engineering staff of the Huntington works, and various technical consultants.

METALS, MINERALS AND ALLOYS

At the recent Mansion House dinner to the bankers, the Chancellor of the Exchequer claimed that the improvement in the overseas balance of payments position had been achieved "without any depletion of our stocks as a whole, indeed there was some increase." Last week-end the *Board of Trade Journal* gave details substantiating that claim by comparing stocks at the end of June last with those at the end of December, 1951. Lead stocks were up by 64 per cent, zinc by 133 per cent, sulphur by 49 per cent and pyrites by 59 per cent. Copper stocks fell, however, by 6 per cent. These increases in stocks were accompanied by falls in consumption in the first half of the year as compared with the second half of 1951. Lead consumption was lower by 36 per cent, zinc by 4 per cent and sulphur by 12 per cent. The consumption of pyrites remained unchanged and copper rose by 16 per cent. The *Board of Trade Journal* emphasizes that reductions in consumption of raw materials are a measure of the extent to which this consumption is dependent on our finding the resources to pay for them, which to-day are constantly at the mercy of comparatively minor fluctuations in world trade in general, and American trade in particular. After passing favourable comment on the Paley Report the *B.T.J.* goes on to re-emphasize that the temporary easing of raw material supplies should not be allowed to obscure the two long term problems of the balance of payments and the prospect of raw material shortage brought out so clearly in the Paley Report.

COPPER.—Although the members of the African Mineworkers' Union decided by an overwhelming majority to give their leaders the power to call a strike in the copper-belt, there will not necessarily be a strike. As this is the first time that a large native union in Africa has obtained strike powers in this way, the leaders may be satisfied to stop short at this demonstration of potential force, especially as the union's means for sustaining a prolonged strike may prove inadequate. Hopes of a peaceful settlement to this dispute are sustained by the Northern Rhodesian Government sending its Commissioner for Mines and Labour to the copper-belt to intervene in the dispute. Since so much of the Northern Rhodesian economy is based on copper, the government has a very real interest in preventing a stoppage and as the authority responsible for public order, it would want to avoid either having all the native copper workers idle or having a conflict between strikers and non-unionists remaining at work.

Meanwhile a majority of the European Mineworkers' Union have voted to ratify the new wage agreement with the copper-belt companies. The agreement is believed to provide for increases of between 3s. and 4s. a shift to artisans, and the unions have undertaken that no fresh wage demands will be presented for two years.

Chilean copper sales to the U.S. from the time the Banco Central took over in May through to the end of September totalled around 165,000 s.tons. Chile's September sales totalled 40,000 s.tons which is substantially in excess of the country's present rate of output, and it is reported from Santiago that producers have sold their entire output to date and that there is no copper for sale outside current contracts. It would appear from this report that in the last two months the apparent accumulation of unsold Chilean stocks have been disposed of, presumably almost entirely to the U.S.

The Australian Minister for National Development estimates that Australian refined copper production will show an increase of at least 18 per cent over last year's figure of 17,000 s.tons. Mount Isa he anticipates will contribute around 10,000 s.tons. As already reported in this column on August 29, Mount Isa is erecting a new smelter with a capacity of 15,000-18,000 tons of ore per annum, which should come into commission next year. In the meanwhile, an important bottleneck which has to be overcome is the supply of shipping to build up the necessary coke reserves.

The American market has remained firm this week, although there has been little activity pending the announcement of November allocations. Domestic producers are reported to be expecting some ceiling price relief before the end of the year, although the O.P.S. has not yet called a meeting to discuss domestic copper pricing with producers.

LEAD.—In the absence of any sustained recovery in the London price, the New York price was further reduced this week by 1c. to 14c., and remained sluggish at this price. There are reports of substantial sales of foreign lead at 13 to 13½c. including duty.

New York dealers seeking to account for the drop in the London price since the resumption of free dealings have suggested that while the London market is now the nearest approach to a genuinely free world market, it cannot yet be regarded as an entirely accurate reflection of the supply/demand situation, as a number of countries still have exchange restrictions preventing their dealing on the London market. It has also been suggested, as has already been pointed out in this column, that apart from Ministry of Materials stocks, stocks in private hands had been accumulating prior to the re-opening of the market and are now having a depressive effect. Having regard to the prospects for American industrial activity it seems difficult, however, to regard the present London price as other than temporarily depressed.

TIN.—Delay in publishing the report of the Bolivian Government on the nationalisation of the tin mining industry, due last week, is held by some observers to be evidence that the nationalisation policy has encountered constitutional difficulties. Some light is thrown on last week's announcement that the Bolivian Government had taken over control of the Patino, Hochschild and avamayo mines in a letter from Patino Mines to its stockholders which says that the Bolivian Government has installed an agent in the Patino offices to approve payments in Bolivia. The letter goes on to suggest the mining companies will continue to operate the mines for the time being, and that the State agencies will exercise their control by holding the purse strings. Such an arrangement would mean that Bolivia need not find either the capital or the foreign exchange to pay the mining companies compensation for expropriation. There is no indication of how this policy of nationalisation by the absorption of financial control will affect the stockholders. From the general air of vagueness which surrounds the question of nationalisation, the Bolivian Government would appear to be still trying to work out a solution to this complex problem. If the present method of remote control does not prove to be effective enough, the government would be able to change its methods and, what is equally important, have the excuse for doing so. If stockholders in the mining companies are dissatisfied with the turn which events have taken, the workers are equally annoyed; they have formed "armed workers' militias" under the Workers' (Miners') Organization and these will continue to exist until the nationalisation decree has been signed.

From next Monday all general U.K. controls on the use of tinplate in containers and packaging will be removed, although the control of distribution of overall supplies by allocation remains. Although the Board of Trade statement announcing this emphasizes that tinplate remains scarce, it seems reasonable to hope that with the recent opening of the new tinplate mills at Trostree in South Wales the end of Britain's shortage of tinplate will soon be in sight. Allowing for the additional capacity now actually in use at Trostree, the U.K. output of tinplate is now at a rate equivalent to about 900,000 tons a year, compared with last year's output of 660,000. Meanwhile, reports from Washington last week announce further relaxations of controls over the use of tinplate.

ZINC.—The experience of resumption of free lead dealings in London suggests that a similar price fall may be awaiting zinc if and when free dealings in that metal are resumed. As it is, the continental price is anything but firm, at about £20 below the controlled Ministry price and indications in New York are that dealers there are bearish, while at the present 13½c. level consumers are confining their purchases largely to metal for immediate delivery. Three U.S. zinc miners with a combined annual output of some 12,000 tons have suspended operations and it is thought that many more will close in the event of further price reductions.

ALUMINUM.—The Japanese Government has at last approved the proposal for Aluminium Ltd. to participate in the Japanese aluminium industry which, it is hoped, will lead to a large drop in Japanese production costs (see *The Mining Journal*, September 5, page 260). Part of the decline will be attributable to the cheaper bauxite coming from the Malayan mines, owned by

Aluminium Ltd., and part will come from the rationalisation of operations. The loan of \$1,792,000 is to be repaid in instalments of one-tenth commencing after three and a half years.

The Alaska project (*The Mining Journal*, August 29, page 230), sponsored by Alcos has moved another step in the direction of fulfilment by the U.S. Secretary of the Interior saying his Department would favour any permanent industrial installation in the territory. The department can sanction the sale of only 160 acres of public land without special legislation. As the new plant would need about 20,000 acres, a bill will have to be presented to Congress. This bill could be opposed by any interests which feel that the proposals will injure them, but the blessing of the Department of the Interior removes one major danger.

The Alaska project is essentially a long term one and for this reason is entirely independent despite a similarity in the expected outputs from the additions to present capacity demanded recently by the Defence Mobilizer, Mr. Fowler. In this connection we now understand that besides the 200,000 tons addition to the U.S. capacity target referred to in this column last week and which is to be achieved by the end of 1954, Mr. Fowler has announced that plans are under consideration for a further 400,000 tons expansion to be completed by 1958. This would bring the target capacity by 1958 to 2,100,000 tons. These tremendous expansion programmes for which there will surely be difficulty in finding adequate cheap electric power (industrial atomic energy can hardly be available so soon) should be read in conjunction with the article appearing on page 430 of this issue describing Alcan's expansion programme in British Columbia.

The London Metal Market

(From Our Metal Exchange Correspondent)

A sharp rise in tin prices was witnessed at the end of last week. This was brought about by covering of short positions and the expectation of a considerable decrease in the stocks of metal on warrant, and by Monday prices had advanced by no less than about £25 per ton, whilst the backwardation widened to around £22-£25 per ton. The stocks did in fact show a fall at the end of last week of 247 tons, but with free sales of cash metal on Tuesday prices declined again and the backwardation became somewhat smaller. The Eastern price on Thursday morning was equivalent to £974 5s. per ton c.i.f. Europe. On Thursday afternoon the market was easy.

Lead prices rallied after touching the low figure of £87 per ton last week to £92 10s. per ton, but have since been drifting down again and on Wednesday touched £86 per ton. There has been some cautious buying by consumers, but producers' sales have had a depressing effect. In America the price was reduced on the 14th instant by 1c. to 14c. per lb. On Thursday afternoon the market was steady quiet.

There has been very little business moving in zinc, and the Continental price is about £95 per ton.

The good demand for copper in the U.S.A. continues, where importers still seem willing to pay the high price asked for Chilean metal. The European price is about 35c. per lb.

CLOSING PRICES AND WEEK'S TURNOVER

| | October 9 | | October 16 | |
|-----------------|------------|-----------|------------|----------|
| | Buyers | Sellers | Buyers | Sellers |
| Tin | | | | |
| Cash | £971 10s. | £972 | £966 | £967 |
| Three months | £957 5s. | £957 10s. | £949 | £950 |
| Settlement | | £972 | | £967 |
| Week's turnover | 585 tons | | 805 tons | |
| Lead | | | | |
| Current month | £91 5s. | £91 15s. | £88 5s. | £88 10s. |
| Three months | £91 5s. | £91 15s. | £88 5s. | £88 10s. |
| Week's turnover | 7,220 tons | | 5,425 tons | |

Iron and Steel

Somewhat unexpectedly the Ministry of Supply has attempted a simplification of the complex price structure in the iron and steel trade. During the past two years there have been very steep advances in the price of foreign ores and the cost of transportation, none of which have been borne by the consumers in this country. The British Iron and Steel Corporation has been responsible for the bulk purchase of these ores and has re-sold supplies to the blast furnace men at prices which have not varied throughout this period. Inevitably there has been a big deficit, which has been made good by means of a levy on steel. In effect pig iron was

subsidized at the expense of the steel makers. This curious financial artifice offered no very obvious advantages and now by a stroke of the pen it is abolished. Henceforth the pig iron makers are to pay for their foreign ore supplies prices more nearly approaching the true cost of purchase and transportation, and in turn they will be permitted to recoup the extra outlay by charging more for their pig iron, whilst the steel makers will be relieved of a substantial part of the levy.

It is in short largely a change of book-keeping. Basic pig iron is advanced 29s. per ton to £13 19s., haematite now quoted £16 2s. is up 40s. d. per ton and a similar rise in the price of low phosphoric iron brings the price of this grade up to £16 8s. per ton. The effect, says the Ministry, will be to increase the production cost of certain iron castings which are, for the most part, not subject to price control, but over 60 per cent of the pig iron used by the iron founders, is unaffected by these price changes, high phosphoric iron being exempt from the Order.

REFINED COPPER PRODUCTION AND STOCKS—SEPTEMBER (000 s.tons)

| | Production | | Stocks | | | |
|-----------------|-------------|------------------|------------------|----------------|---------------|----------------|
| | Sept., 1952 | Jan.-Sept., 1952 | Jan.-Sept., 1951 | Sept. 30, 1952 | Aug. 31, 1952 | Sept. 30, 1951 |
| U.S.A. | 99 | 869 | 893 | 71 | 84 | 62 |
| Other countries | 96 | 917 | 896 | 157 | 167 | 163 |
| World | 195 | 1,786 | 1,789 | 228 | 251 | 225 |

Source: American Copper Institute.

OCTOBER 16 PRICES

COPPER
Electrolytic £285 0 0 d/d

LEAD AND TIN

(See our London Metal Exchange report for Thursday's prices)

ZINC

| | | |
|------------------------------------|---------|--------------|
| G.O.B. spelter, foreign, duty paid | | £118 0 0 d/d |
| G.O.B. spelter, domestic.... | | £118 0 0 d/d |
| Electrolytic and refined zinc | | £122 0 0 d/d |
| Special high grade | | £124 0 0 d/d |

ANTIMONY

| | | |
|--------------------------|---------|-----------------------------------|
| English (99%) delivered, | | £225 per ton |
| 10 cwt. and over | | £210 per ton |
| Crude (70%) | | 20s. — 22s. nom. per unit, c.i.f. |
| Ore (60% basis) ... | | unit, c.i.f. |

NICKEL

99.5% (home trade) £454 per ton

OTHER METALS

| | | |
|--------------------------------|--|--|
| Aluminium, £157 per ton. | | |
| Bismuth, 17s. lb. | | |
| ;(min. 2 cwt. ex-warehouse). | | |
| Cadmium, (Empire) 14s. 4d. lb. | | |
| Chromium, 6s. 6d. lb. | | |
| Cobalt, 20s. lb. | | |
| Gold, 248s. f.oz. | | |
| Iridium, £65 oz. nom. | | |
| Magnesium, 2s. 10d. lb. | | |
| Manganese Metal (96%-98%) | | |
| 2s. 2d./2s. 3d. per lb. d/d | | |

ORES, ALLOYS, ETC.

| | | |
|-------------|---------|------------------------|
| Bismuth ... | | 65% 9s. 9d. lb. c.i.f. |
| | | 60% 9s. 6d. lb. c.i.f. |

Chrome Ore—

| | | |
|---------------------------------|------------------------------|--------|
| Rhodesian Metallurgical (lumpy) | £14 2s. per ton | c.i.f. |
| " " (concentrates) | £14 2s. per ton | c.i.f. |
| " " Refractory | £13 14s. per ton | c.i.f. |
| Baluchistan Metallurgical | £15 8s. per ton | c.i.f. |
| Magnesite, ground calcined | £26 - £27 d/d | |
| Magnesite, Raw ... | £10 - £11 d/d | |
| Molybdenite (85% basis) ... | 105s. 10d. per unit | c.i.f. |
| Wolfram (65%) ... | 425s. c.i.f. U.K. buying | |
| Tungsten Metal Powder | 447s. d/d U.K. selling | |
| (for steel manufacture) | 31s. 7d. nom. per lb. (home) | |
| Ferro-tungsten | 28s. 7d. nom. per lb. (home) | |
| Carbide, 4-cwt. lots | £32 3s. 9d. d/d per ton | |
| Ferro-manganese, home | £49 0s. 8d. per ton | |
| Manganese Ore U.K. | 6s. per unit | |
| (48% - 50%) ... | 2s. 8d. per lb. basis. | |
| Brass Wire | 2s. 3d. per lb. basis. | |
| Brass Tubes, solid drawn | 2s. 3d. per lb. basis. | |

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The gilt-edged market, which began the period with an easier tendency following uncertainty over the result of the Government's funding operations, turned distinctly firmer after the outcome was known. Clearly, the operation cannot be termed an unqualified success, but it is at least out of the way. Substantial quantities of the loans remain to be paid off next year, and this coming on top of the current budget deficit, cannot be considered as satisfactory. Bear covering, however, created a better tone on Wednesday.

Kafir shares were quiet and uninteresting during the week. Doornfontein fell while awaiting the result of the quarterly report. After the results given by Johnnies and Union Corporation, the market slightly improved. One factor common to the figures of both finance houses was the considerable reduction in money received from premium sales. General Mining and Finance declared an interim dividend of 2s a share, the same as last year.

In the O.F.S. section Welkom recorded a substantial fall following rumours that the company had again been encountering severe water difficulties, and also that a new issue would have to be made in the near future. In some responsible circles it is thought that such money as may be required will be found internally by the Anglo American Corporation and that it will be unnecessary to resort to public subscription. Freddie's North announced good development results at their No. 2 shaft; values equivalent to 803 in.-dwt. and 571 in.-dwt. were encountered in different sections. In the No. 1 shaft area developments recorded 370 in.-dwt. Both North and South Leases state that their reduction plants will be completed before the end of the year. St. Helena produced good quarterly figures. Profits were up by nearly £12,000 although a reduction of about £2,000 in premium must be set against this. The second deflection in the Harmony LR8 borehole gave a value of 1,897 in.-dwt. The shares, however, remained unaffected. Both Free State Geduld and Western Holdings hardened in anticipation of the development results which are expected shortly.

| FINANCE | <i>Price Oct. 15</i> | <i>↑ or ↓ on week</i> | O.F.S. |
|-------------------------------|--------------------------|---------------------------|-------------------|
| African & European..... | 24 | - | Freddies |
| Anglo American Corp. | 6 | - | Fredric S. |
| Anglo-Gold..... | 19 1/4 | - | Gerald |
| Anglo Transvaal Consol. | 6 | - | Geofrids |
| Central Mining (f 1/2)..... | 33 1/4 | - | Harmony |
| Consolidated Goldfields | 44 1/4 | - | Lorraine |
| Consol. Mines Selection | 25/ | - | Lydenburg Estates |
| East Rand Consols..... | 2 1/4 | - | Merriespruit |
| General Mining..... | 4 | - | Middle Witte |
| Harrington Prop. | 31/3 | - | Mr. Steyn |
| Henderson Transvaal..... | 9 1/2 | - | President Brand |
| Johnnie..... | 2 1/2 | - | President Steyn |
| Rand Mines..... | 4 1/2 | - | St. Helena |
| Rand Selection..... | 37/6 | - | U.F.S.C. & G. |
| Strathmore Consol. | 26/3 | - | Virginia Ord. |
| Union Corp. (2/6 units) | 31/- | - | Welkom |
| Witwatersrand Estates..... | 3 1/2 | - | Western Holdings |
| Wits..... | 3 1/2 | - | |
| West. Wits..... | 47/6 | - | |

Diamonds were mainly the turn easier in spite of some continental support. Sales of gem stones are declining but those of industrials have improved. Talk of a subsidy for Rhodesian gold mines left the market unaffected although Globe and Phoenix rose following the better profit announced for September.

Coppers all showed considerable falls on the threatened native strike. The Government have intervened to try to settle the dispute : if they fail it is thought that the men may stop work next Monday. The permanency of the present price level of the metal is also being questioned.

Tin shares are meeting increased confidence among investors. The price of the metal has remained very steady in spite of many prophets of woe last year. Taking a longer view, it is thought that if the industry can get over the interim period satisfactorily, there may be a prospect of shorter supplies and increased demand. Many of the leading companies have now enjoyed considerable prosperity for some years and are building up impressive balance sheets. In addition, the Nigerian columbite producers may receive an increased price backdated to last May and this section also has encountered buying. Berrals were quoted ex dividend. The price steadied at a fall of 3s. 9d. against a 3s. 4jd. net dividend, thus confounding last week's market opinion that the shares might quickly recover following this event.

Dollar issues were unsettled. Wall Street was weak but Montreal remained steady although prices moved irregularly in a rather featureless market. Some local demand for International Nickels developed and this caused a sharp rise in the price.

Oils were very idle although there was some slight speculative interest in Attock, Burmahs and Anglo-Iranians. Shell eased following the lower tanker freight rates and Ultramar also shed 14d. on the lower output for September.

COMPANY NEWS AND VIEWS

Five of the twelve gold producers over which Central Mining & Investment Corporation in association with Rand Mines Ltd., exercise technical and administrative control have recently issued their reports and accounts for the year ended June 30, 1952, and the salient features of their operations during this period are given in the table below.

Blyvoor Develops Lower Grade Area

An improvement in the labour force at Blyvooruitzicht during the year enabled 205,000 tons more to be sent to the mill compared with the preceding year and although the grade was lower and the revenue dropped by as much as £1 per ton milled, working profit rose by £168,670. This reacted favourably on the available surplus after providing for all expenses including heavy tax liabilities and shareholders received 2d. per 2s. 6d. share more than in 1951, which absorbed £3,400,000 against £3,200,000 in 1951.

Capital expenditure during the year, excluding expenditure on the erection of the uranium plant, amounted to £376,297 and it is estimated that during the current year capital expenditure will amount to approximately £800,000.

Development footage advanced at 41,463 ft. (41,056 ft.) was virtually the same as for the preceding year. Of this total, 14,625 ft. were sampled on the carbon leader, 94.4 being payable averaging 49.0 dwt. per ton over a width of 12 in. equivalent to 588 in.-dwt. These figures do not compare with the 20,620 ft. sampled on the carbon leader in 1951 which showed 97.9 per cent payability averaging 600 in.-dwt. but during the year under review there was an increase in the proportion developed in the lower grade area in the western portion of the property. The total contraction in reef development work was due to the necessity to employ additional labour on development in country rock and to delays caused by water bearing fissures.

Blyvoor is one of the mines selected for the production of uranium and the balance sheet at June 30, 1952, records that expenditure for this purpose totalled £1,608,267 against which borrowings amounting to £1,599,103, including accrued interest, had been made.

Consol Main Reef's Reduced Ore Reserves

In contrast to Blyvoor, the labour force at Consolidated Main Reef decreased during the year but this did not prevent the company from raising its tonnage throughput by 22,000 tons. Despite this good performance and the fact that the grade of ore crushed was actually 0.036 dwt. higher as was the revenue per ton, working profit fell by £121,292 compared with 1951 owing to an increase in working costs by 1s. 7d. per ton. The net profit was nearly £50,000 lower and shareholders experienced a sizeable drop in their dividend income.

Development footage advanced at 45,259 ft. was 2,960 ft. less than in the previous year, due to concentrating the work in the more promising areas. There was some improvement in the results obtained and in the ore reserve positions on the Kimberley Reef, the Main Reef Leader, and the Main Reef, but on the company's two main tonnage contributors, the Bird Reef and the South Reef, results were disappointing and the ore reserve position on these two reefs deteriorated.

Due to rising costs and the consequent increase in the pay limit, a substantial tonnage of low grade ore was again rendered unpay-

able. In fact, the amount of ore developed during the year was insufficient to replace that mined, with the result that the total available ore reserve declined by 757,000 tons, about 40 per cent of this decrease being attributable to the higher pay limit.

Modder East's Profits Back to Pre-devaluation Levels

Continued inflationary pressure and a decrease in the quantity of ore milled resulted in a further material increase in working costs per ton milled, thereby depressing profits to pre-devaluation levels and raising the pay limit, are the general comments on the position of Modder East made by its directors in the report and accounts for the year under review.

The lower tonnage milled was mainly due to a slight fall in the average size of the labour force and to the necessity to increase the amount of development work undertaken in the company's new Klipfontein lease area. In the northern sector of this area good progress has been made with development work and small blocks of ore have been included in the available ore reserve; in the northern corner of the area, however, boreholes drilled in advance of the development workings have not as yet intersected payable reef. Values disclosed by development in the southern sector have not been encouraging.

Available ore reserves declined by 768,000 tons, approximately 20 per cent of which is attributable to an increase in the pay limit.

New Modderfontein to Make Further Capital Repayment

At the end of January last, New Modderfontein East distributed 6d. per share to shareholders which reduced the authorized issued capital to £630,000 in 2,800,000 shares of 4s. 6d. each and it is now proposed to reduce the value of the shares to 4s. each by giving shareholders a further 6d. per share.

New Modder is now essentially a reclamation project, normal operations having been discontinued on March 29 and restarted on a much reduced scale on April 3 last. During the year, operations were confined to reclamation work in the upper levels of the north-western portion of the mine and a start has been made on clean-up operations at the South Mill. Because of the rapid depletion of the ore reserve there was no re-estimation of the ore reserve at the year end. However, it is stated that good progress is being maintained with the recovery and salvaging of plant and material for sale and it is expected that the monthly tonnage milled, inclusive of the tonnage derived from clean-up operations, will be in the region of 7,000-8,000 tons.

Welgedacht Increases Mill Throughput

Welgedacht Exploration, like Consolidated Main Reef, was able to increase its tonnage throughput with a smaller labour force but the advantage so gained was practically nullified by a rise in working costs of 8d. per ton so that despite the better performance figures, working profit only improved by £290 on the preceding year.

Development work was again confined to the more promising sections within the No. 2 shaft zone and percentage payability improved from 30.4 to 48.6 per cent although total footage advanced was down from 9,159 ft. to 7,289 ft. Nevertheless, payable ore developed amounted to 247,900 tons at 2.6 dwt. compared with 213,800 tons at 2.7 dwt. during the preceding year with the result that ore reserves were strengthened by the addition of 42,000 tons.

| Company | Year to June 30 | Milled (000's tons) | Grade (dwt.) | Yield (oz.) | Per ton milled Cost s. d. | Profit s. d. | Working Profit £ | Tax £ | Net Profit £ | Divi- dend s. d. | Carry Forward £ | Ore Reserves* | |
|-------------|--------------------|---------------------------|-----------------|----------------|---------------------------------|-----------------|------------------------|-----------|--------------------|------------------------|-----------------------|-----------------|-----------------|
| | | | | | | | | | | | | Tons (000's) | Value (dwt.) |
| Blyvoors | 1952 | 1,298 | 12.6 | 819,176 | 44 7 | 118 7 | 7,695,319 | 3,240,953 | 4,493,075 | 2 10 | 1,252,788 | 5,257 | 12.5 |
| | 1951 | 1,093 | 14.1 | 772,268 | 45 5 | 137 9 | 7,526,649 | 3,140,988 | 4,423,615 | 2 8 | 943,899 | 5,517 | 13.0 |
| Consol M.R. | 1952 | 2,283 | 2.7 | 312,352 | 29 8 | 5 8 | 646,292 | 179,980 | 436,168 | 6 3 | 488,128 | 4,337 | 3.4 |
| | 1951 | 2,361 | 2.7 | 305,179 | 28 1 | 8 10 | 767,384 | 280,184 | 485,671 | 7 6 | 451,940 | 5,094 | 3.3 |
| Modder E. | 1952 | 1,409 | 2.3 | 165,656 | 24 6 | 6 1 | 426,360 | 133,125 | 289,058 | 4 6 | 239,425 | 2,646 | 3.1 |
| | 1951 | 1,457 | 2.4 | 174,225 | 21 9 | 9 3 | 670,531 | 256,492 | 418,139 | 7 0 | 200,981 | 3,414 | 3.1 |
| New Modder | 1952 | 209 | 2.9 | 30,536 | 33 8 | 4 3 | 44,764 | 945 | 58,265 | Nil | 175,506 | No estimate | |
| | 1951 | 282 | 2.4 | 33,599 | 26 3 | 4 6 | 64,061 | 13,435 | 41,402 | Nil | 165,929 | 32 | 3.6 |
| Welgedacht | 1952 | 405 | 2.3 | 47,758 | 27 2 | 3 6 | 70,825 | 175 | 58,070 | Nil | 71,312 | 555 | 2.6 |
| | 1951 | 396 | 2.3 | 45,988 | 26 6 | 3 7 | 70,535 | 205 | 56,666 | Nil | 52,936 | 513 | 2.6 |

*Available ore reserves.

South Kalgurli's Bigger Output and Smaller Profits

An improved grade of ore and more of it, was mined by South Kalgurli Consolidated during the year to March 31 last and sent to the Croesus Mill. Consequently, output increased, revenue from the sales of bullion was higher but the rise in mining costs, together with heavier tax liabilities reduced net profit below the net earnings figure achieved in the previous year.

| Year to Mar. 31 | Bullion | | | | | |
|-----------------|---------------|--------------|-------------|------------|---------------------|--------|
| | Milled (tons) | Grade (dwt.) | Yield (oz.) | Proceeds £ | Ore Reserves (tons) | (dwt.) |
| 1952 | 92,690 | 5.76 | 23,703 | 303,211 | 190,536* | 5.75 |
| 1951 | 90,836 | 5.30 | 21,387 | 264,614 | 186,607* | 5.79 |

*Tonnage refers to ore blocked out and does not include 124,643 tons of "probable" ore. Tonnage "probable" ore in 1951 was 128,571.

| Year to Mar. 31 | Mining Costs | | | | | |
|-----------------|--------------|---------|--------|--------------|------------|-----------------|
| | Revenue £ | Costs £ | Tax £ | Net Profit £ | Dividend % | Carry Forward £ |
| 1952 | 303,211 | 262,434 | 21,700 | 12,603 | 25 | 12,307 |
| 1951 | 264,614 | 225,121 | 18,500 | 14,379 | 35 | 13,407 |

Shareholders received less and after allocating £500 (£3,000) to tax equalization reserves and writing £5,000 off British Government securities, the balance remaining to be carried forward was approximately £1,000 lower than the amount brought in.

Mr. T. Prior is chairman and a report of his speech made at the annual meeting held yesterday in London is recorded on page 440.

Rising Costs Reduce Geita's Profits

The fall in the grade of ore milled by Geita Gold Mining together with a rise in working costs by over 1s. per ton put an end to any hopes the company might have entertained of emulating the results achieved in the preceding year.

| Year to June 30 | Working Profit | | | | | |
|-----------------|----------------|--------------|-------------|-------------------------|------------|---------|
| | Milled (tons) | Grade (dwt.) | Yield (oz.) | Per ton milled Cost (£) | Profit (£) | (th.) |
| 1952 | 212,600 | 3.0 | 32,409 | 35.8 | 3.7 | 39,416* |
| 1951 | 196,573 | 3.4 | 33,584 | 34.6 | 8.3 | 81,709 |

*Includes revenue from premium gold sales.

However, the diamond drilling and development programme is going ahead and of the 2,358 ft. advanced during the year, 925 ft. were sampled giving a payability of 55.9 per cent having an average value of 5.26 dwt. per ton. While this figure is satisfactory in value it does not compare with the previous year's development total when 3,195 ft. were cut and, in fact, it was not sufficient to maintain ore reserves. However, arrangements have been made to rectify this deficiency and as a result the average monthly footage advanced during May and June increased to 497 ft. compared with the monthly average for the year under review of 197 ft.

Geita Gold Mining is a private company incorporated in Tanganyika and is controlled by Kentan Gold Areas which owns 89.95 per cent of the ordinary issued share capital.

The consolidated profit and loss account of Kentan Gold Areas shows that the loss for the year amounted to £53,061 (£7,758) of which £5,438 (£691) was attributable to outside shareholders.

The annual meeting will be held in London on October 30. The Rt. Hon. Earl Gray is chairman.

Company Shorts

New Union Reaches Settlement With Mr. Erleigh.—New Union Goldfields has announced that all disputes, claims, and rights of action between the company and Mr. Norbert Erleigh have been amicably settled.

Mr. Erleigh has withdrawn the pending action instituted by him against the company for the delivery of 127,500 shares in General Exploration Orange Free States ("Geoffries") from New Union, and the company has withdrawn all its actions against Mr. Erleigh.

In addition, the following claims against the company have been settled by mutual agreement:

Claim by New Nigel Estate and Gold Mining Co., for the delivery of 375,000 "Geoffries" shares, plus damages in respect thereof, against payment by it of the sum of 2s. 6d. per share; claim by South African H.E. Proprietary for the delivery of 25,000 "Geoffries" shares, together with a further contingent claim for

the delivery of 37,500 "Geoffries" shares, all against payment by it of the sum of 2s. 6d. per share; claim by Rooderend Main Reef Mines Ltd. for damages in the sum of £104,785 in respect of shares in Free State Development and Investment Corporation ("Freddies").

The amounts payable by New Union in terms of all the above-mentioned settlements total £11,589 including costs. These payments have now been made and the company states that it has no further liability in respect of these matters.

After giving effect to the settlements above, the following claims remain outstanding by and against the company: Claims by Transvaal Agency and Siberian Syndicate for delivery of 300,000 and 37,500 "Geoffries" shares respectively; claims by Mr. I. Cohen and others for damages in respect of New Union General Industries shares—£48,000; claims by Shares and Investments (Proprietary) for damages in respect of certain Option and Prospecting Contracts—£15,000; claim by Mr. J. Milne in respect of profits on dealings in shares of New Free State Gold Estates—£91,574; and finally an action by New Union against Mr. J. Milne for payment of an amount of £108,722.

Urwira's Big Profit Expansion.—Gross revenue of Urwira Minerals for the year ended March 31, 1952, totalled £451,944 (£299,699), the major source of revenue being from sales of concentrates, produced by the company's pilot mill, which advanced from £298,786 to £451,454. Mining costs were appreciably heavier, £299,225 against £231,438 and after providing for all other commitments and liabilities, including the provision of £64,195 (£52,372) for depreciation, there remained £77,719 available as excess of income over expenditure. Of this amount £25,000 (nil) was provided against a fall in the market prices for the metals resulting from concentrate and the remainder, £52,719, was transferred to development account.

Harmony's Second Deflection of LR8 Yields 1,897 dwt.—Harmony Gold Mining has announced that in the second deflection of borehole LR8 the Basal Reef was intersected at a borehole depth of 5,042 ft. assaying 62.2 dwt. over a true width of 30.5 in., equivalent to 1,897 in.-dwt.

There was some loss of core owing to grinding. A final deflection is being drilled.

The Leader Reef of negligible width was intersected at a borehole depth of 4,992 ft.

No. 1 Shaft at Lorraine Gold Cuts Basal Reef.—Lorraine Gold Mine has announced that its No. 1 shaft intersected the Basal Reef at 4,805 ft. below the collar, and that at a depth of 4,818 ft. the Reef was displaced owing to a fault and the shaft entered a dyke.

The company further announced that the Reef exposed was sampled at 5 ft. intervals around the perimeter and that the 11 sections sampled gave an average value of 65.61 dwt. over a channel width of 5.33 in., equivalent to 350 in.-dwt.

MR. RUDOLPH CLAUDE SAVORY

We record with deep regret the death of Mr. Rudolph Claude Savory, one of the partners in the firm of Messrs. Foster and Braithwaite, which followed on a stroke while he was out shooting on his estate, Thorpland Hall, at Fakenham, Norfolk, on Monday last. He was aged 67.

Mr. Savory was educated at Harrow and Magdalen College, Oxford, subsequently joining his father's firm of Foster and Braithwaite. He served in the First World War during which he reached the rank of major. He came of a family long associated with the City and occupied for many years a prominent position in the tin world, and was, at the time of his death Vice-Chairman of the Malayan Chamber of Mines, Chairman of Tanjong Tin Dredging, Kinta Tin, and Idris Hydraulic Tin. He was also on the London Committee of Petaling Tin and Riverine Rubber Estates. Treading in the steps of the late Messrs. Osborne and J. F. Chappell, who were largely responsible for the renaissance of tin mining in Malaya and the Far East, and who believed in capitalizing the companies with which they were connected on the basis of a low price for tin, Mr. Savory always adopted an objective attitude in regard to the metal and was opposed to the tin restriction policy which sought to restrict output in order to maintain high prices.

After the death of the late Mr. C. V. Thomas, he succeeded to the chairmanship of several of the companies of that group, a position which he held at the time of his death. Mr. Savory visited the Malay States some years before the last war and was particularly interested in technical experiments designed to facilitate deep-level dredging which were interrupted by World War II and further postponed by difficulties in obtaining equipment and the general uncertainties in which tin undertakings were involved subsequently. Mr. Savory leaves two sons, one of whom, Mr. John Savory, joined him in the firm of Foster and Braithwaite. He was interred at St. Mary's, Great Snoring, and a memorial service is to be held later in the City of London.

SOUTH KALGURLI CONSOLIDATED LTD.

The Thirty-Ninth Annual General Meeting of the Company was held on Thursday, October 16, 1952, at 1, Broad Street Place, Finsbury Circus, London, E.C.2.

Mr. T. Pryor, D.S.O., M.Inst.M.M. (Chairman of the Company), presided.

The Chairman, in the course of his speech, said: In the year ended March 31, 1952, the revenue from sales of bullion increased by £38,600. This was due to three factors: the grade of the ore sent to the mill increased from 4.74 dwt. to 5.16 dwt. per s.ton; there was a slight increase in the tonnage treated; and there was a receipt of £10,366 in respect of profit on gold sales on the open market over and above the fixed price of £A.15 9s. 10d. per oz. This latter important contribution to our revenue arose from the decision by the Commonwealth Government in November, 1951 to allow newly mined gold to be sold on the open market for United States' dollars. These sales, which commenced with gold lodged in November, 1951, are effected by the newly formed Gold Producers' Association Ltd. How necessary was this partial alleviation of hardship caused by a fixed price for gold is shown by the fact that working costs were £262,434, an increase of £37,300 over the previous year.

On the advice of the auditors, the Board decided to provide out of the available profit for the decrease in the market value of our investments in British Government securities. Accordingly, £5,000 has been utilized to write these down from £40,040 to £35,040. This step is purely precautionary, as the securities are both dated and it is possible for us to receive their full nominal value on redemption. An addition of £500 to the taxation equalization reserve has been made in order to spread the benefit of the initial allowances received on additions to fixed assets. Such allowances ceased to be given on additions to fixed assets after April 5 last. These allocations, coupled with the need to conserve our cash position for future capital expenditure, and the fact that during the current year we cannot expect further increases in the sale price of gold to offset the continuing rises in costs due to inflation, made it necessary for the Board to reduce the total dividend payments for the year from 35 per cent to 25 per cent, thus reverting to the normal rate of dividend which applied for the five years to March, 31, 1947.

The profit and loss account shows that £21,700, or roughly two-thirds of our total working profit of £33,330, has to be paid to the British Government in taxation. Apart from the special difficulties which all gold mining concerns experience in these days of managed currencies, it cannot be emphasized too strongly that the British Government is subjecting metal mining companies operating overseas to taxation on a scale which is altogether unfair and which makes it exceedingly difficult to provide for the new capital equipment needed to maintain the mine efficiently. Strong representations on this matter have been repeatedly urged upon the Government by the British Overseas Mining Association, but so far with meagre effect.

Turning now to the work underground, the extracts from the general managers' report, which have been circulated to you with the accounts, show that interesting new discoveries were made on the 21st, 20th, 19th and 17th levels, which have enabled the head value of the ore sent to the mill during the year to be increased by 0.42 dwt. per s.ton, whilst the total ore reserves remain at the same tonnage as for the previous year, with a slight increase in their average value from 5.05 dwt. to 5.09 dwt. gold per s.ton.

The principal difficulties of the company are not the mining and development problems, but are due to the ever rising costs due to inflation, which still continue. Our latest gold sales in the open market in September, 1952, realized £A.16 11s. 9d. per f.oz., a figure which is only 191 per cent above the 1939 figure, whereas the basic wage, plus industry allowance, is now £A.13 18s. per week, or 247 per cent over the figure for 1939 and the general wholesale prices of goods in Australia is just over 300 per cent above the average for the three years ended June, 1939. This discrepancy between the price of gold and the cost of wages and commodities must be put right before world trade can return to normal prosperity, but it is not yet possible to say when this may come to pass.

The Hon. H. C. Havenga, Minister of Finance in the Union of South Africa, has long been an active advocate for an upward revision of the gold price and the gold mining industry is greatly indebted to him for his persistent efforts. In a statement which he broadcast over the B.B.C. recently, Mr. Havenga told us that at the last meeting of the International Monetary Fund he had hoped to get the problem examined afresh by the countries represented. Although Australia was the only country which actively supported his advocacy at that Conference, Mr. Havenga believed the conviction was spreading that a gold price increase would greatly facilitate exchange stability and the flow of international trade.

The report and accounts were adopted.

JOHANNESBURG CONSOLIDATED INVESTMENT CO., LTD.

(Incorporated in the Union of South Africa)

MINING COMPANIES' REPORTS FOR QUARTER ENDED
SEPTEMBER 30, 1952

GENERAL REMARKS—The revenue from gold has been calculated on the basis of gold at 249s. 6d. per f.oz. for July, 249s. 3d. for August and 249s. 10d. for September, 1952. In determining the payable development footage, gold has been taken at 248s. 3d. per f.oz. The development figures are the actual results of the sampling of development work on reef; no allowance has been made for modifications which may be necessary when computing the ore reserves.

10 and 11, Austin Friars, London, E.C.2. October 15, 1952.

The East Champ D'Or Gold Mining Co. Ltd.

(Incorporated in the Union of South Africa)

ISSUED CAPITAL £250,875

Crushed 88,000 tons; yielding 13,327 f.oz. gold

| | Per ton crushed s. d. | Per f.oz. gold produced s. d. |
|---------------------------|-----------------------------|--|
| Revenue from Gold | £ 166,279 | 37 9 |
| Working Costs | 142,828 | 32 5 |
| | | 214 4 |
| 23,451 | 5 4 | |
| 754 | | |
| Profit for Quarter | 24,205 | |

In addition to the above, £3,571 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices.

Taxation for the quarter is estimated at £39,921.

The expenditure on capital projects amounted to £3,982.

The DEVELOPMENT FOOTAGE sampled 985 ft., and gave the following results: PAYABLE, 530 ft., having an average value of 4.7 dwt. over 43 in. UNPAYABLE, 335 ft., having an average value of 2.2 dwt. over 41 in.

Government Gold Mining Areas (Modderfontein) Consolidated Ltd.

(Incorporated in the Union of South Africa)

ISSUED CAPITAL £1,400,000

Crushed 773,000 tons; yielding 96,424 f.oz. gold

| | Per ton crushed s. d. | Per f.oz. gold produced s. d. |
|---------------------------|-----------------------------|--|
| Revenue from Gold | £ 1,203,019 | 31 1 |
| Working Costs | 1,072,701 | 27 9 |
| | | 222 6 |
| 130,318 | 3 4 | |
| 22,200 | | |
| Profit for Quarter | 152,518 | |

In addition to the above, £26,914 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices.

The Government's share of profits for the quarter is estimated at £20,537.

THE RIVER REEDON LTD. has decided to erect a Pyritic Recovery Plant on this Company's property at an estimated cost of £125,000, which sum it is estimated will be expended over the next eighteen months. The expenditure in this connection for the quarter ended September 30, 1952, amounted to £2,200.

Arrangements are being made for the disposal of the product.

The **DEVELOPMENT FOOTAGE** sampled totalled 6,018 ft. and gave the following results: PAYABLE, 4,780 ft., having an average value of 4.5 dwt. over 48 in. UNPAYABLE, 2,238 ft., having an average value of 2.0 dwt. over 82 in.

New State Areas, Ltd.

(Incorporated in the Union of South Africa)

ISSUED CAPITAL £1,514,037

Crushed 139,000 tons; yielding 17,677 f.oz. gold

| | Per ton crushed s. d. | Per f.oz. gold produced s. d. |
|---------------------------|-----------------------------|--|
| Revenue from Gold | £ 220,537 | 31 9 |
| Working Costs | 222,522 | 32 0 |
| | | 251 9 |
| 1,985 | 0 3 | |
| 5,058 | | |
| Profit for Quarter | 3,073 | |

In addition to the above, £4,437 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices. (Note.—There was no liability in respect of Government's share of profits or tax rates for the quarter.)

The **DEVELOPMENT FOOTAGE** sampled totalled 1,897 ft., and gave the following results: PAYABLE, 381 ft., having an average value of 8.2 dwt. over 29 in. UNPAYABLE, 1,316 ft., having an average value of 1.9 dwt. over 31 in.

The Randfontein Estates Gold Mining Co. Witwatersrand, Ltd.

(Incorporated in the Union of South Africa)

ISSUED CAPITAL £4,063,553

Crushed 1,058,000 tons; yielding 124,063 f.oz. gold

| | Per ton crushed s. d. | Per f.oz. gold produced s. d. |
|---------------------------|-----------------------------|--|
| Revenue from Gold | £ 1,547,988 | 29 3 |
| Working Costs | 1,476,066 | 27 11 |
| | | 238 0 |
| 71,902 | 1 4 | |
| 18,623 | | |
| Profit for Quarter | 90,425 | |

In addition to the above £33,121 accrued during the quarter in respect of increased revenue from sales of gold at enhanced prices. (Note.—There was no liability in respect of tax rates for the quarter.)

The expenditure on Capital Account amounted to £4,212.

In the Report to the Directors for the quarter ended June 30, 1952, the expenditure on Capital Account was shown as £92,657 which included £85,172 expended to date in connection with the uranium project. During the current quarter a sum of £121,361 was expended on this project, making a total of £211,361 which will be met from Loan Funds.

The **DEVELOPMENT FOOTAGE** sampled totalled 6,074 ft., and gave the following results: PAYABLE, 3,900 ft., having an average value of 7.2 dwt. over 41 in. UNPAYABLE, 5,170 ft., having an average value of 1.9 dwt. over 39 in.

BURMA MINES LTD.

An Interim Report of Burma Corporation (1951) Ltd. dated September 25, 1952, has been received from Rangoon on some of the more important features of the Corporation's activities pending finalization of the Accounts to June 30, 1952, which is subject to some delay.

During the twelve months to June 30, 1952, sales of products obtained from processing surface stocks amounted to:—

| | |
|----------------------|--------------|
| Refined Piglead..... | 4,798 tons |
| Refined Silver | 231,670 ozs. |

and 3,251 tons of other products,

all of which realized satisfactory prices. Surface stocks remaining are estimated to yield ultimately 1,400 tons refined lead; 180,000 oz. silver; plus some quantity of other products.

Available labour at the Mine has been utilized solely on repairs and maintenance in preparation for the resumption of mining, the initial target being 8,000 tons per month. For this target a trained labour force of 1,600 is required. The force has been increased from 497 on February 1, to 1,058 and recruiting still continues, but it is too early to say whether the recruits, mostly drawn from indigenous sources, will be adequate to requirements.

Rehabilitation of the Mansam Falls Hydro-electric Power Station now in progress will bring available hydro-electric power to 4,000 kW, the minimum required for extraction and treatment of 8,000 tons of ore a month.

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